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U. S. DEPARTMENT OF AGRICULTURE

# *Cooperative* ECONOMIC INSECT REPORT

*Issued by*

PLANT PEST CONTROL BRANCH

AGRICULTURAL RESEARCH SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE

# AGRICULTURAL RESEARCH SERVICE

# PLANT PEST CONTROL BRANCH

## PLANT PEST SURVEY SECTION

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Branch serves as a clearing house and does not assume responsibility for accuracy of the material.

Reports and inquiries pertaining to this release should be mailed to:

Plant Pest Survey Section
Plant Pest Control Branch
Agricultural Research Service
United States Department of Agriculture
Washington 25, D. C.

Volume 6 July 20, 1956 Number 29

# COOPERATIVE ECONOMIC INSECT REPORT

## Highlights of Insect Conditions

GRASSHOPPERS continue outstanding agricultural insect problem in Iowa and Minnesota, infestations generally heavy in Oklahoma and threatening to severe locally in some central Kansas counties. Damage continues to increase in Utah and populations still threaten crops in North Dakota. Counts decreased in Missouri but remain high in northern and western areas. South Dakota, Kentucky and some other areas also report abundance. (pp. 683, 703). EUROPEAN CORN BORER remains heavy in eastern areas. High populations in some early-planted corn in Ohio but populations have not developed as expected in areas of Wisconsin. First-generation moths out in Missouri and heavy in northern Alabama. Second-brood emergence will be drawn out in Iowa. (pp. 684, 703).

CHINCH BUG damage continues in central Kansas and areas of Missouri. Migrating into corn in Illinois. Light infestation in eastern Oklahoma. (p. 684). CORN EARWORM heavy on corn in Tennessee, moderate in eastern Nebraska and increasing in southern Missouri and northern Utah. (p. 685). CORN LEAF APHID damaging barley in some Utah counties and requiring control on this crop in Red River Valley, Minnesota. Heavy infestations on corn and/or sorghums in Kansas, Nebraska, Iowa, Missouri, Tennessee and Louisiana. (p. 686). CORN SAP BEETLES are numerous in Delaware, Maryland and northeastern Arkansas. Appearing in Tennessee. (p. 686).

FALL ARMYWORM heavy on young corn in Independence County area of Arkansas. Also infesting corn in Kansas, Delaware and New York. (pp. 687, 703). WHEAT STEM MAGGOT heavier than normal in Wisconsin. (p. 687). WESTERN YELLOW-STRIPED ARMYWORM widespread in northern California. (p. 687).

PEA APHID building up in alfalfa in southwest Idaho and continues problem in areas of Colorado, Utah and Wisconsin. (p. 688). SPOTTED ALFALFA APHID reported from Illinois for first time. Increasing in Sacramento Valley, California. Widespread in northeastern Arkansas. Light infestations in areas of Kansas, Texas Panhandle and very light populations appearing in southern Nebraska. (p. 688). ALFALFA CATERPILLAR becoming abundant in eastern South Dakota and adults prevalent in Loup Valley, Nebraska. (p. 688).

Second-brood CODLING MOTH active in Eastern States. (p. 691). ORCHARD MITES increasing in some counties of Indiana, Wisconsin and West Virginia. (pp. 691, 703). MEDITERRANEAN FRUIT FLY reported in additional county of Florida. (p. 692).

MEXICAN BEAN BEETLE damaging beans in Colorado and Utah areas; also troublesome in areas of North Carolina, Rhode Island and Delaware. (p. 693). TOMATO FRUITWORM heavy on tomatoes in Tennessee and Plaquemine Parish, Louisiana; some damage in southeastern Pennsylvania. (p. 693). POTATO LEAFHOPPER heavy on potatoes in Wisconsin and eastern Virginia. Building up in potatoes in southeastern Pennsylvania and on legumes in Iowa. (p. 693). POTATO PSYLLID higher than for several years in Colorado. (p. 694). BEET LEAFHOPPER collected for first time this year at East St. Louis, Illinois. Curly top as high as 20 percent in canning tomatoes in Weld and Adams Counties, Colorado. (p. 695).

HORNWORM infestations unusually heavy on tobacco in Maryland. (p. 696).

BOLL WEEVIL threatening in areas of North Carolina where little activity earlier in the season. High infestations and considerable damage in west Tennessee. High counts also in northeastern Alabama, northwest and southern Georgia and several Louisiana parishes. First-generation weevils increasing in Mississippi and central Texas and emergence underway in Arkansas. (p. 697). BOLLWORMS appearing in Arizona and increasing in Louisiana, Missouri, Texas and in Muskogee County, Oklahoma. Moths active in Louisiana and northern Mississippi. (p. 697). Texas reports first COTTON LEAFWORM this season. (p. 698).

FALL WEBWORM heavy in east central Oklahoma. Continues of concern in Georgia, Louisiana and some other areas. Appearing as far north as Wisconsin. (p. 698). JACK-PINE BUDWORM adults emerging in Minnesota, damage conspicuous in some Wisconsin counties. (p. 699). EUROPEAN ELM SCALE unusually heavy in some areas of Wisconsin, also heavy in Decatur County, Kansas. (p. 699).

HORSE FLIES above normal in southeastern Idaho and troublesome in areas of Utah. (p. 701).

WEATHER outlook and summary. (p. 690).

CORRECTION. (p. 692).

STATES reporting - 42.

ADDITIONAL NOTES. (p. 703).

SURVEY METHODS for JACK-PINE BUDWORM. (p. 705).

Distribution maps of RANGE GRASSHOPPERS. (p. 710).

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Reports in this issue are for the week ending July 13 unless otherwise designated.

## CEREAL AND FORAGE INSECTS

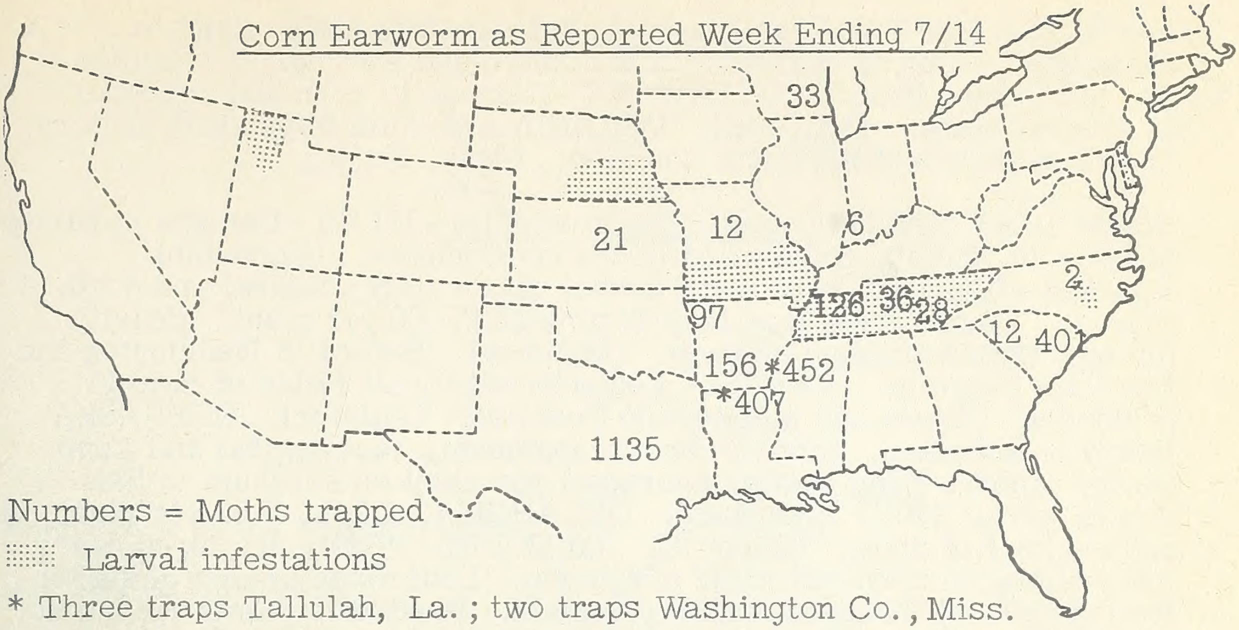
GRASSHOPPERS - NEVADA - *Camnula pellucida* developing very rapidly. From 6000-8000 acres infested in Elko, Eureka and Humboldt Counties. (Gallaway, July 7). IDAHO - Nymphs, third to fourth instars, congregating in green vegetation on roadsides and in creek bottoms in southwestern area. Populations very spotted, occasionally as high as 80 per square yard. Some control. (Portman). Average of 25 nymphs per square yard on roadsides in Downey area. In Shoshone area, populations low generally but spots have up to 10 per square yard. (Smith). UTAH - Damage continues to increase in many areas. Adults becoming noticeably abundant some places. (Knowlton). OKLAHOMA Heavy general infestation over State. Extensive damage to cotton, corn, sorghum, alfalfa, soybeans and rangeland. *Melanoplus differentialis*, *M. bivittatus* and *M. femur-rubrum* most abundant crop species; adults over State. (Coppock). SOUTH DAKOTA - Abundant in some local areas in southeast and east central regions. Most areas have 8 nymphs per square yard but some as many as 12. Dominant species *M. femur-rubrum*. (Hantsbarger). KANSAS - Threatening to severe in local areas of some central counties, 10-30 per square yard throughout some pastures and cropland. Dominant crop species are *M. differentialis*, *M. bivittatus* and *M. mexicanus*. Primary range species is *Ageneotettix deorum*. Reports of destructive infestation in row crops and gardens continue from most areas. (Matthew). MISSOURI - Nymph and adult counts remain high in margins, pastures and legumes over northern and western areas although count less than last week. Locally heavy rains have slowed migrations into crops. Adult *M. differentialis* found over State but most in late instars. *M. bivittatus* egg-laying continues but adults declining in southwest. (Kyd, Thomas). NEBRASKA - Migrating rapidly. Crop species range from 5-45 per square yard in margins to 4-10 in alfalfa fields. *M. bivittatus* and *M. mexicanus* mostly adults. A few adult *M. differentialis* but most in third and fourth instar. From 1-15 rangeland grasshoppers per square yard in Hooker, Blaine, McPherson, Logan, Lincoln and northwestern Custer Counties. *A. deorum* dominant species. (Andersen). NORTH DAKOTA - Continue to threaten crops in many areas, especially late crops. Thirty to 50 percent of grasshoppers adults. Major infestation in western area made up of *M. bivittatus* (60 percent), *M. mexicanus* (20 percent or less) and other species. (N. D. Ins. Rept.). MINNESOTA - Continue number one agricultural insect problem. (Minn. Ins. Rept.). TEXAS - Heavy locally on sorghums in Palo Pinto County. (Lindsey). KENTUCKY Second and third instars of *Melanoplus* sp. abundant in bluegrass and legume fields. (Thurston). ILLINOIS - Maximum population in southern area was 6 per square yard. Heavier in western and northwestern areas. (Ill. Ins. Rept.). FLORIDA - *Schistocerca americana* heavily infesting corn and tobacco at Bronson, Levy County. (Farrell, July 7). MARYLAND - Local damage to margins of soybean fields in Wicomico County; unusually severe in one large field. (U. Md., Ent. Dept.). DELAWARE - *Melanoplus* spp. injuring corn and soybeans some areas. (Milliron).

EUROPEAN CORN BORER (Pyrausta nubilalis) - NORTH DAKOTA Only light infestation in northern Cass County, 10 egg masses per 100 plants. (N. D. Ins. Rept.). MINNESOTA - Borers per 100 plants: south central 132, southwest 128, southeast 37, central 49. (Minn. Ins. Rept.). SOUTH DAKOTA - Average percent of plants infested in southeast continues at 11 percent. Most borers third and fourth instars, some entering stalks. (Hantsbarger). WISCONSIN - Populations have not developed as expected in some areas. (Wis. Ins. Bul.). OHIO - Oviposition practically complete, most eggs hatched. Due to humid weather, relatively high larval establishment and many early-planted fields of susceptible strains show high populations of young larvae. (C. R. Neiswander). KANSAS - From 2-12 percent infestation in Doniphan and Jefferson Counties. One field in Jefferson County had 71 percent pupation. (Burkhardt). MISSOURI - First-generation moths 30 percent emerged in southeast; 7 borers and 4-8 egg masses per 100 plants. Mostly late instars in east central and northwest areas; 27 percent emerged in west central area. (Burdett). NEBRASKA - Light in Loup Valley, 0-60 plants of 100 show feeding. (Andersen). ARKANSAS - Pupation nearly complete in northeast, second brood adults about 80 percent emerged. Infestations heavier in Randolph County than in 1955. (Warren, Harrendorf, Barnes). ALABAMA - Pupation about complete in northern area, heavy moth flights. (Eden). MARYLAND - Eggs of second generation appearing on corn in Talbot and Dorchester Counties, 3 masses per 100 plants. First-generation damage to sweet corn light to moderate in Kent and Frederick Counties. (U. Md., Ent. Dept.). PENNSYLVANIA - More than for past several years on early corn in Snyder County. (Gesell). Generally abundant but many very heavy infestations, 15-20 borers per plant, in some fields in Juniata County. (Udine). Spotted infestations in southeast. (Menusan). NEW JERSEY - So heavy that continuous spray program warranted on sweet corn. (Ins.- Dis. Newsltr.). DELAWARE - Heavy in field corn, unusually prevalent in sweet corn. (Milliron).

CORN ROOTWORMS - KANSAS - Diabrotica sp. causing corn lodging in one location in Ottawa County. (Matthew). MISSOURI - Diabrotica longicornis adults in fields scattered over State, 1-2 per plant in most fields but a few fields in northwest and extreme southeast have 7-8 beetles per plant. Larval injury becoming evident. (Kyd, Thomas).

CHINCH BUG (Blissus leucopterus) - OKLAHOMA - Light general infestation in eastern area, some marginal damage to corn and sorghum in isolated fields. (Coppock). KANSAS - Injury to milo continues in central area. Rains have decreased populations very little. (Matthew). MISSOURI - Continues problem over much of northern half of State and in scattered fields in central and southeast areas. Rains have slowed damage but heavy numbers persist in untreated fields. (Kyd, Thomas). ILLINOIS - Migrations to corn in several areas, particularly north sections. (Ill. Ins. Rept.).

SAND WIREWORM (Horistonotus uhlerii) - GEORGIA - Heavy on corn in Wayne County, June 19. (Blickenstaff).


Corn Earworm as Reported Week Ending 7/14

Numbers = Moths trapped

▨ Larval infestations

* Three traps Tallulah, La. ; two traps Washington Co., Miss.

CORN EARWORM (Heliothis zea) - LOUISIANA - One to 20 per 100 sweeps on alfalfa in Natchitoches, Bossier and Caddo Parishes. (Oliver). TENNESSEE - Heavy on corn. (Mullett). MISSOURI - Moths increasing over southern half of State and in southeast from 75-100 percent of ears have 1-12 larvae per ear. About 3 eggs per silk on field corn. (Kyd, Thomas). NEBRASKA - Moderate in corn Loup Valley area and in southeast counties. Five to 30 plants of 100 infested. Damage in whorl and tassel. (Andersen). UTAH - Increasing in corn in Utah, Salt Lake, Davis and Box Elder Counties. (Knowlton). NORTH CAROLINA - Average of .5 egg per silk at Clayton. County-wide infestation in Duplin County; 100 percent infestation in untreated ears. (Farrier, Reid, Brett). MARYLAND - Remains light in most sections. (U. Md., Ent. Dept.). DELAWARE - Infesting tassels at Bridgeville. (Milliron).

SOUTHWESTERN CORN BORER (Zeadiatraea grandiosella) - KANSAS - As high as 30 percent infestation near St. John, Stafford County. One to 4 percent infestation in Barton, Reno and Dickinson Counties. (Painter). ARKANSAS - Generally light in northwestern counties. First-generation larvae pupating July 5. (Warren, Harrendorf, Barnes).

BROWN WHEAT MITE (Petrobia latens) - IDAHO - General infestation with numerous eggs in Power County, June 29. Minor damage. (Schow). General on grasses and grains in southeastern area. (Portman, Gittins).

RICE STINK BUG (Solubea pugnax) - LOUISIANA - Building up in grass turn rows and rice fields, 11-34 per 100 sweeps in St. Landry, Acadia and Vermillion Parishes. (Oliver).

JAPANESE BEETLE (Popillia japonica) - MARYLAND - Light to moderate feeding on soybeans in Wicomico and Dorchester Counties. (U. Md., Ent. Dept.). DELAWARE - Damage to corn and soybeans at several places. (Milliron). VIRGINIA - Medium infestation on corn in Cumberland and Fluvanna Counties. (Seay, Smith).

CORN LEAF APHID (Rhopalosiphum maidis) - UTAH - Damage to barley in parts of Uintah, Emery and Duchesne Counties. (Knowlton). KANSAS - Reported from many areas, particularly central and north central. Counts from less than 10 to over 2,000 per plant. Heavily infested plants showing damage. (Matthew). Severe in Washington and Marshall Counties. (Marvin). Found in nearly all fields of milo in Dickinson, Ottawa and McPherson Counties. (Painter). NEBRASKA Heavy on sorghum, light on corn in southeast, east central and Loup Valley areas. Lady beetles average 1 per plant on sorghum in Hall County area. (Hill, Andersen). OKLAHOMA - Light, 0-50 per plant, in eastern half of State. (Coppock). MISSOURI - Widely scattered heavy infestations on corn and grain sorghums. Leaf discoloration in fields having several thousand aphids per plant. Predators numerous but not controlling. (Kyd, Thomas). MINNESOTA - Necessitating control in some late barley in Red River Valley. (Minn. Ins. Rept.). TENNESSEE - Heavy populations infesting tassels of corn generally. (Mullett). LOUISIANA - Heavy on corn in Rapides and Pointe Coupee Parishes. (Oliver).

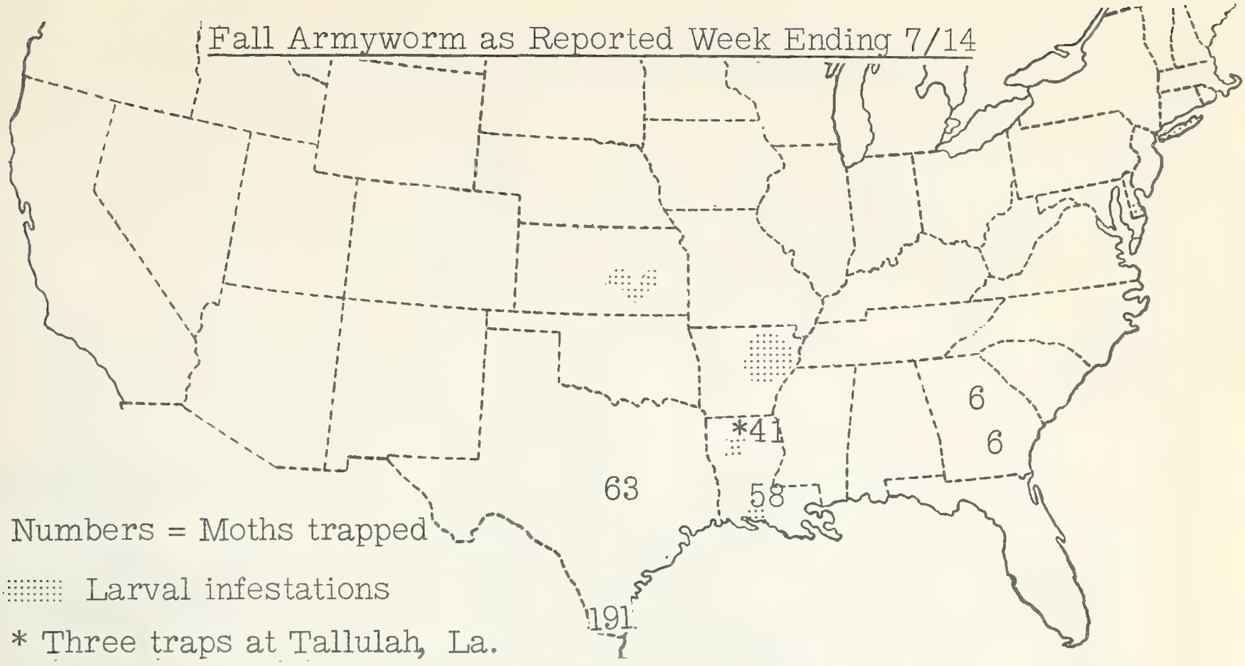
CORN SAP BEETLES - NEW JERSEY - Heavy damage by European corn borer encouraging sap beetles. (Ins.-Dis. Newsltr.). DELAWARE - Carpophilus lugubris abundant on corn, as a primary and secondary invader. Especially numerous in Bridgeville-Georgetown area on sweet corn, damaging silks. (Milliron). MARYLAND - Abundant following European corn borer or corn earworm damage. (U. Md., Ent. Dept.). TENNESSEE - Appearing on corn. (Mullett). ARKANSAS - Numerous in many corn fields in northeastern counties, some damage to silking corn. Colaspis sp. also involved. (Warren, Harrendorf, Barnes).

HESSIAN FLY (Phytophaga destructor) - PENNSYLVANIA - Considerable infestation in many wheat fields of Juniata County. One field 75 percent infested, 3-4 "flaxseeds" per stem. (Udine).

LEAF MINERS - TENNESSEE - Heavy populations of corn leaf miners occurring in Cumberland plateau area. (Mullett).

CRICKETS - NEVADA - An infestation, believed to be Plagiostira gillettei, on 400 acres of rangeland in western Humboldt County. Populations of 2-3 per square yard. (Gallaway). MINNESOTA - Injury to flax and small grains in some areas. (Minn. Ins. Rept.).

A BURROWING WEBWORM (Acrolophus sp.) NORTH CAROLINA - Lawns attacked in Iredell, Wake and Guilford Counties with almost total destruction in each instance. (Stamey, Wagner, Rabb).


Fall Armyworm as Reported Week Ending 7/14

Numbers = Moths trapped

▦ Larval infestations

* Three traps at Tallulah, La.

FALL ARMYWORM (Laphygma frugiperda) - KANSAS - From 2-12 percent infestation in corn in Barber, Stafford, Reno and Harvey Counties. Many larvae in late instars. (Painter, Gates, Matthew). ARKANSAS Very heavy on young corn in Independence and adjacent counties. Up to 85 percent of stalks infested in some fields with as high as 5 larvae per stalk. (Warren, Harrendorf, Barnes). LOUISIANA - Populations declined, 6-20 per 100 sweeps in Acadia and Vermillion Parishes. Parasites and diseases aided in reduction. (Oliver). DELAWARE Attacking late corn at Smyrna. (Milliron).

WHEAT STEM MAGGOT (Meromyza americana) - WISCONSIN - Much heavier and more widespread than normal on small grains. (Wis. Ins. Bul.). PENNSYLVANIA - Two to three percent damage in wheat in Armstrong County. (Adams).

APHIDS - IDAHO - A clover aphid (unidentified) found generally infesting sweetclover in southeastern area. (Portman).

SWEETCLOVER APHID (Myzocallidium riehmi) - WASHINGTON - Populations low on sweetclover in Palouse and Columbia Basin regions, 0-17 per 25 sweeps. (Johansen).

CLOVER APHID (Anuraphis bakeri) - IDAHO - Beginning to build up on seed clover in Canyon County, control in several fields. (Scott).

WESTERN YELLOW-STRIPED ARMYWORM (Prodenia praefica) - CALIFORNIA - Infestations common in alfalfa in widespread areas of northern California. (Cal. Coop. Rept.).

PEA APHID (Macrosiphum pisi) - COLORADO - Continues to overshadow spotted alfalfa aphid. (Exp. Sta.). UTAH - Some severe damage to alfalfa in Unitah and Emery Counties. (Knowlton). IDAHO - General in alfalfa in southeastern area, building up in some southwestern counties. (Portman, Gittins, Barr). NEBRASKA - Down due to second cutting of alfalfa, 23 per 10 sweeps in Loup Valley. (Andersen). MINNESOTA - Somewhat lower than last year, 1-40 per sweep in southeast, south central and central areas. (Minn. Ins. Rept.). WISCONSIN - Continues heavy on alfalfa in some counties. (Wis. Ins. Bul.).

SPOTTED ALFALFA APHID - CALIFORNIA - Increasing in Sacramento Valley as far north as Red Bluff. Common in a few fields in Tehama County. Infestations not known in Siskiyou, Modoc, Lassen, Sierra, Plumas or Colusa Counties nor north of Alameda County in coastal area. (Cal. Coop. Rept.). COLORADO - Heaviest population around Hartman, Prowers County. (Exp. Sta.). KANSAS - Non-economic to light in central and north central, 20-600 aphids per 25 sweeps. Same situation in northeast where counts run 50-125 per 25 sweeps generally. Some fields in Lyon County (east central) had as high as 750-2700 per 25 sweeps of 25-inch net. Predators low in most fields. (Matthew, Burkhardt). Heavy populations causing some damage in local areas of Barton County. (Gates). NEBRASKA - Very light infestations found in Dundy and Gage Counties. Up to 1 per sweep in Dundy and 2 per 100 sweeps in Gage. (Hamilton, Hill, Andersen). OKLAHOMA - Continues low in eastern area. One field in Cleveland County had 1500 per 10 sweeps but other fields in vicinity had low infestations. (Coppock). TEXAS - Light widespread on alfalfa in Castro, Reeves, Floyd and Bailey Counties. (Richardson). ARKANSAS - Widespread in northeastern area, up to 250 per sweep. (Warren, Harrendorf, Barnes). ILLINOIS - A few specimens collected in Jackson County. No damage. Determined M. W. Sanderson, confirmed L. M. Russell. (Ill. Ins. Rept.). First report for Illinois. LOUISIANA - Remains light in Caddo, Bossier, Red River and Natchitoches Parishes. (Oliver).

CUTWORMS - MICH. - Larvae, particularly Agrotis ypsilon and Actebia fennica, widespread on lowland from Indiana line to Traverse City. Several reports of armyworm trouble but none seen were true armyworm. (Hutson).

ALFALFA CATERPILLAR (Colias philodice eurytheme) - SOUTH DAKOTA Becoming abundant in alfalfa of east central and southeast regions. Six larvae per 10 sweeps. (Hantsbarger). IDAHO - General but light in Oneida, Bannock and Bingham Counties and south central area. (Gittins). NEBRASKA - Adults very prevalent in alfalfa in Loup Valley. Ten larvae per 10 sweeps. (Andersen).

BLISTER BEETLES - IDAHO - Spotted in alfalfa in Oneida, Bannock and Bingham Counties but not very abundant. (Gittins). KANSAS - Epicauta causing considerable damage to soybeans and alfalfa in Bourbon and Labette Counties. (Marvin). MISSOURI - Damage continues in scattered soybean and alfalfa fields. (Kyd, Thomas). OKLAHOMA - Epicauta spp. remain common in alfalfa, over one per sweep in isolated fields. (Coppock).

CLOVER LEAFHOPPER (*Aceratagallia sanguinolenta*) - SOUTH DAKOTA - Numerous in some alfalfa fields, up to 72 per 10 sweeps. (Hantsbarger).

CHALCIDS - OREGON - More than normal damage to crimson clover in Linn County. (Every). WASHINGTON - *Bruchophagus gibbus* adults active in several fields of red clover for seed in Columbia Basin, up to 65 per 25 sweeps in field near Quincy. (Johansen).

MEADOW SPITTLEBUG (*Philaenus leucophthalmus*) - MAINE - More numerous than for several years. Distribution of this insect now known to be Statewide. (Simpson).

PLANT BUGS - IDAHO - Lygus average 7 adults and 10 nymphs per sweep in untreated alfalfa seed fields in Oneida County. About 2 per sweep in alfalfa and red clover in Bingham County. (Portman, Gittins). UTAH - Lygus abundant generally. Damaging buds of untreated alfalfa in Duchesne and Uintah Counties. (Knowlton). KANSAS - Numerous in alfalfa in Geary, Riley, Dickinson and Ottawa Counties. Some seed alfalfa had 2-12 bugs per sweep. Dominant species are *Adelphocoris lineolatus* and *L. lineolaris*. (Matthew). NEBRASKA - From 10-25 *L. lineolaris* adults per 25 sweeps in alfalfa in 5 central counties. From 5-10 *A. lineolatus* adults per 25 sweeps in alfalfa in Loup Valley. (Andersen). MINNESOTA - Five to 6 lygus per sweep in red clover in Roseau County. (Minn. Ins. Rept.). ARKANSAS - *L. lineolaris* heavy, averaging up to 10 per sweep in Independence and Jackson Counties. (Warren, Harrendorf, Barnes).

POTATO LEAFHOPPER (*Empoasca fabae*) - DELAWARE - Prevalent on soybeans and potatoes. (Milliron).

ALFALFA WEEVIL (*Hypera postica*) - CALIFORNIA - More injurious in Modoc County than for many years. (Cal. Coop. Rept.). IDAHO Adult populations generally above average in alfalfa in southeastern area. (Portman, Gittins, Scott).

LESSER CLOVER LEAF WEEVIL (*Hypera nigrirostris*) - WASHINGTON Severe in heads of red clover at Elma. (Howitt).

SWEETCLOVER WEEVIL (*Sitona cylindricollis*) - NEVADA - Light infestation in Washoe County. First record for State. (Gallaway). IDAHO - Adult damage general on sweetclover in southeastern area, leaf damage about 30 percent. (Portman).

TWO-SPOTTED SPIDER MITE (*Tetranychus telarius*) - WASHINGTON Moderate in some fields of red clover for seed in Columbia Basin, up to 1,430 per 25 leaflets in field near Quincy. (Johansen).

SPIDER MITES - MISSOURI - A very few fields of soybeans in extreme southeast showing considerable loss of foliage. (Kyd, Thomas).

THREE-CORNERED ALFALFA HOPPER (Spissistilus festinus) - LOUISIANA - Forty to 124 per 100 sweeps in legumes in 7 parishes. (Oliver). ALABAMA - Heavy infestations in Elmore County. (Arant). ARKANSAS - Increasing but continues light on alfalfa, 3 per 10 sweeps. (Warren, Harrendorf, Barnes).

GARDEN WEBWORM (Loxostege similalis) - KANSAS - Damage to alfalfa in Comanche and Osborne Counties. (Gates).

BEAN LEAF BEETLE (Cerotoma trifurcata) - MISSOURI - From 1-4 beetles per linear foot of row causing considerable leaf injury of soybeans in scattered fields in some areas. (Kyd, Thomas).

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## WEATHER BUREAU'S 30-DAY OUTLOOK

### Mid-July to Mid-August 1956

The Weather Bureau's 30-day outlook for the period from mid-July to mid-August calls for temperatures to average below seasonal normals in the northeastern quarter of the United States. In the remainder of the country above normal temperatures are predicted except near normal along the northern and western borders and in the South Atlantic States. Precipitation is expected to exceed normal in the Great Lakes region and Mid-West. Subnormal amounts are indicated in the West Gulf States, the Far West, and the Northern Rocky Mountain States. Elsewhere near normal precipitation is anticipated.

Weather forecast given here is based on the official 30-day "Resume and Outlook", published twice a month by the Weather Bureau. You can subscribe through Superintendent of Documents, Washington 25, D. C. Price $4.80 a year, $2.40 for six months.

## WEATHER FOR THE WEEK ENDING JULY 16, 1956

A high pressure cell, located in the center of the country at the beginning of the period, which moved out over the Southeast by Friday was preceded and followed by rains and accompanied by generally cooler temperatures. Under the almost daily influence of cloudy skies and precipitation a large area surrounding the Great Lakes also experienced cool weather. Weekly temperature averages in this section were below normal by 6° at St. Louis, Mo., and 5° at Omaha, Nebr., Knoxville, Tenn., and Pittsburgh, Pa. Even slightly greater minus departures existed in a small western area with Winnemucca, Nev., averaging -9° and Red Bluff and Fresno, Calif. -7 and -6°, respectively. In the Northwest and the southern Plains States temperatures averaged near normal to slightly above with +4° to +5° reported in northern Texas. Maximum readings of over 100° continued to occur daily in California-Arizona desert areas and southwestern Texas. Precipitation was general over the eastern half of the Nation, falling

(Weather continued on p.703 )

## FRUIT INSECTS

CODLING MOTH (Carpocapsa pomonella) - RHODE ISLAND - Extensive and severe larval damage in neglected orchards. Control programs effective. (Steve). PENN - First generation emerged July 11 in Adams County. (Asquith). DELAWARE - New brood moths emerging daily. (Stearns). VIRGINIA - Hatching of second brood in northern area expected latter part of month. Injury to some apples will occur. (Hill). OHIO - No second brood at Wooster. (Cutright). INDIANA - New entries moderate but persistent in Orleans area. (Marshall). Second-brood larvae entering apples July 9 in Vincennes area. Adult activity high next ten days. (Hamilton). ILL. - Larvae plentiful; protection needed. (Chandler).

RED-BANDED LEAF ROLLER (Argyrotaenia velutinana) - WISCONSIN - Medium infestations on apple in Door County now pupating. May build higher populations. (Wis. Ins. Bul.). OHIO - Second-generation adults emerging. (Cutright). VIRGINIA - Light in apple orchards in northern area, but expected to increase by July 20. (Morris).

APPLE MAGGOT (Rhagoletis pomonella) - MICHIGAN - Adults at Beulah and Traverse City. (Hutson). OHIO - First fly on July 2; light emergence to July 13. (Cutright). RHODE ISLAND - Adults abundant and ovipositing in neglected orchards. (Steve).

ORCHARD MITES -INDIANA - Increasing rapidly on apples in Orleans area. (Marshall). Populations vary in Vincennes area. Moderate amount of mottling. (Hamilton). WISCONSIN - Populations of Metatetranychus ulmi increasing on apple in Door County. (Wis. Ins. Bul.). VIRGINIA - M. ulmi spotted in apple orchards in northern area and expected to decrease by end of month. Tetranychus schoeni just showing up and expected to get worse. (Hill). OREGON - Localized damage to cherry trees by Vasates fockeui in La Grande area, July 6. (Every).

APPLE APHID (Aphis pomi) - OHIO - Severe in a few orchards. (Cutright). VIRGINIA - Quite a problem in northern area orchards during June and still a problem in some untreated orchards. Not expected to get worse this year. (Hill).

ROSY APPLE APHID (Anuraphis roseus) - OHIO - Infestation generally light. (Cutright).

APHIDS - RHODE ISLAND - Abundant and building up in apple orchards. (Steve). CALIFORNIA - An aphid (Thoracaphis umbellulariae) found for first time in avocados in Santa Barbara County. Known to be widely scattered along southern coast to San Francisco Bay area. (Cal. Coop. Rept.).

PEAR LEAF BLISTER MITE (Eriophyes pyri) - WISCONSIN - Heavily infesting pear trees in Milwaukee, Grant and other southern counties. (Wis. Ins. Bul.).

UNSPOTTED TENTIFORM LEAF MINER (Callisto geminatella) - ILLINOIS - First serious infestation in Carbondale area. Young larvae in mines and average of 1 adult per leaf. (Chandler). PENNSYLVANIA - Larvae infesting 80 percent of leaves in poorly-sprayed apple orchard in Juniata County. (Udine).

JAPANESE BEETLE (Popillia japonica) - VIRGINIA - Adults increased rapidly after rain and now moderate in northern area apple orchards. (Hill). Attacking plums and apples in Roanoke County. Very heavy in several locations. (Allen). Attacking grapes in Louisa County and populations increasing rapidly compared with 1955. (Andrews).

ORIENTAL FRUIT MOTH (Grapholitha molesta) - PENNSYLVANIA - Larvae in peach tips in Adams County. (Asquith). ARKANSAS - Populations extremely light this year. Light infestation may occur in some orchards of late varieties. (Warren, Harrendorf, Barnes).

PEACH TREE BORER (Sanninoidea exitiosa) - MICHIGAN - First adult at Paw Paw July 2. (Hutson).

A BUD MOTH - MISSISSIPPI - A bud moth, probably Gretchena bolliana causing injury to young pecan trees in Smith County. (Hutchins).

CHERRY FRUIT FLY (Rhagoletis cingulata) - IDAHO - Found in Payette and Washington Counties. Infestations approached 5 percent in one orchard. (Scott).

WHITE-MARKED TUSSOCK MOTH (Hemerocampa leucostigma) - WISCONSIN - Larvae severely defoliating some fruit trees in Milwaukee County. (Wis. Ins. Bul.).

BLACK-HEADED FIREWORM (Rhopobota naevana) - Hatch nearing completion. Larvae feeding on new cranberry growth, blossoms and small berries. (Wis. Ins. Bul.).

CRANBERRY FRUITWORM (Acrobasis vaccinii) - WISCONSIN - Adults laying eggs. Newly-hatched larvae observed feeding on small berries, July 7-8. (Wis. Ins. Bul.).

A TORTRICID (Sparganothis sp.) -NEW JERSEY - Large numbers of moths present, migrating into cranberry bogs. Trouble expected about July 10. (Ins. -Dis. Newsl.).

MEDITERRANEAN FRUIT FLY (Ceratitis capitata) - FLORIDA - First find in St. Lucie County reported July 11. Pest has now been found in 22 counties. (P.P.C.).

CORRECTION: CEIR 6(28): 680. In checking past records of PEAR PSYLLA (Psylla pyricola) in Idaho, it was found that the species had been recorded in the southwestern area in 1953. (Hilfiker and Manis)--see CEIR 3(32):588, 1953.

## TRUCK CROP INSECTS

MEXICAN BEAN BEETLE (Epilachna varivestis) - COLORADO - Heavy damage to beans in Larimer, Weld, Adams and Boulder Counties. Egg deposition heavy: larval development started. (Exp. Sta.). UTAH - Damaging in Uintah, Duchesne, Utah, Salt Lake, Weber and Box Elder Counties. (Knowlton). NORTH CAROLINA - General on lima beans in Duplin County. (Reid). RHODE ISLAND - Larvae feeding on beans in Johnston. Damage severe, but not extensive. (Steve). DELAWARE - Generally troublesome in small plantings. (Milliron).

SPIDER MITES - VIRGINIA - Infestations increasing on beans and foliage; injury apparent in Eastern area. (Brubaker, Greenwood, Hofmaster).

PALE-STRIPED FLEA BEETLE (Systena blanda) - MICHIGAN - Injuring lima beans at Allegan and Saginaw. (Hutson).

GREEN CLOVERWORM (Plathypena scabra) - VIRGINIA - Causing some injury to snap beans in eastern area. (Brubaker, Greenwood, Hofmaster). DELAWARE - Occurs on beans several places. (Milliron).

ALFALFA LOOPER (Autographa californica) - WASHINGTON - Spotted infestation with medium to severe damage to few pea and alfalfa fields in Grant, Yakima and Benton Counties. Light damage to mint in Benton County. Three to 4 larvae per sweep. (Kamal).

TOMATO FRUITWORM (Heliothis zea) - LOUISIANA - Severely damaging tomato fruits in Plaquemine Parish. (Oliver). PENNSYLVANIA - Some damage on early tomatoes in southeastern area. (Menusan). TENNESSEE - Heavy populations on tomatoes occurring in State. (Mullett).

POTATO LEAFHOPPER (Empoasca fabae) - WISCONSIN - Heavily infesting many potato fields. Infestations on snapbeans light in Sheboygan County. (Wis. Ins. Bul.). MINNESOTA - Adults active. Nymphs expected to be abundant. (Minn. Ins. Rept.). PENNSYLVANIA - Building up on potatoes in southeastern area. (Menusan). MARYLAND - Heavy on lima and snap beans in Wicomico County. (U. Md. Ent. Dept.). VIRGINIA - Heavy infestations on unharvested potatoes on Eastern Shore. (Brubaker, Greenwood, Hofmaster). DELAWARE - Prevalent on beans and potatoes. (Milliron).

POTATO FLEA BEETLE (Epitrix cucumeris) - WISCONSIN - Heavy infestation occurring in most sections on untreated potatoes. (Wis. Ins. Bul.). RHODE ISLAND - Numbers decreased markedly in potato fields. (Steve). MAINE - Populations of overwintered beetles very light on treated potatoes in Aroostook County. (Shands).

POTATO APHIDS - MAINE - Aphid populations on untreated potatoes very light in Aroostook County. Less than 5 percent as many plants infested as same period in 1955. (Shands).

LEAFHOPPERS - IDAHO - Empoasca filamenta populations about 10 to 15 adults per sweep in south central and southeastern areas. (Gittins). TEXAS - Medium widespread populations on tomatoes in Motley County. (Pallmeyer).

HORNWORMS (Protoparce spp.) - VIRGINIA - Severe on tomatoes in Northumberland County; over 500 acres sprayed. (Saville). DELAWARE - General on tomatoes but not very destructive. (Milliron).

FLEA BEETLES - PENNSYLVANIA - Becoming a problem on potatoes in southeastern area. (Menusan).

COLORADO POTATO BEETLE (Leptinotarsa decemlineata) - WISCONSIN - Damage on untreated potato vines. (Wis. Ins. Bul.). RHODE ISLAND - Light infestations on tomato plants in Johnston - Exeter. (Steve). MINNESOTA - Fairly abundant but populations generally less than in 1955. (Minn. Ins. Rept.). MARYLAND - Light to moderate damage in some large tomato fields in Wicomico and Somerset Counties. (U. Md., Ent. Dept.). DELAWARE - Injurious to tomatoes many places. (Milliron).

EUROPEAN CORN BORER (Pyrausta nubilalis) - NEW JERSEY - Severe in local areas in potatoes, as many as 9 borers per plant. (Ins. -Dis. Newsl.). VIRGINIA - Adults very numerous in potato fields in eastern area. (Brubaker, Greenwood, Hofmaster).

CABBAGEWORMS - NORTH DAKOTA - Larvae of Pieris rapae, 3 to 4 per plant, on cabbage in Fargo area. (N. D. Ins. Rept.). MARYLAND - Trichoplusia ni and P. rapae heavy on untreated cabbage in all sections. (U. Md., Ent. Dept.). VIRGINIA - P. rapae damaging broccoli, cauliflower and cabbage in Augusta County. (Woodside). DELAWARE - Conspicuous foliage injury to tomatoes generally. Heavy on kale at Ellendale. (Milliron). LOUISIANA - Several larvae of T. ni per plant damaging collards in Plaquemine Parish. (Oliver).

POTATO PSYLLID (Paratrioza cockerelli) - COLORADO - Feeding in potatoes and tomatoes in northeastern area. Populations much higher than for several years. (Exp. Sta.).

STINK BUGS - LOUISIANA - Nezara viridula and Euschistus sp. severely damaging tomato fruits in Plaquemine Parish. (Oliver).

BLISTER BEETLES - OKLAHOMA - Averaged 3 to 4 per tomato vine in Coweta area; some damage. (Coppock). VIRGINIA - Large numbers of Epicauta sp. damaging tomatoes in Crimora section of Augusta County. (Woodside). DELAWARE - E. pestifera appearing on potatoes at Middletown. (Milliron).

YELLOW-STRIPED ARMYWORM (Prodenia ornithogalli) - DELAWARE - Destructive to peppers near Dover. (Milliron).

WESTERN BLACK FLEA BEETLE (Phyllotreta pusilla) - IDAHO - Moderate infestation in some potato fields in southwestern Bingham County. (Gittins).

WIREWORMS - MINNESOTA - A problem in sugar beets and potato fields in Red River Valley area. (Minn. Ins. Rept.).

BEET LEAFHOPPER (Circulifer tenellus) - ILLINOIS - Collected first time this year in East St. Louis on horseradish. (Ill. Ins. Rept.). COLORADO - Curly top virus as high as 20 percent in canning tomatoes in Weld and Adam Counties. (Can. Ins.).

SQUASH BUG (Anasa tristis) - TEXAS - Heavy infestations noted in Cochran County. (Thompson). OKLAHOMA - Common on cucurbits over State. Isolated melon vines damaged in Purcell area. (Coppock). KENTUCKY - Egg laying commencing on squash in central area. (Thurston). DELAWARE - Abundant on squash in southern area. (Milliron). RHODE ISLAND - Adults and eggs on most cucurbit plantings. (Steve).

SQUASH VINE BORER (Melittia cucurbitae) - VIRGINIA - Infesting summer squash in Augusta County. (Woodside). DELAWARE - Injurious to squash in southern area. (Milliron).

STRIPED CUCUMBER BEETLE (Acalymma vittata) - SOUTH CAROLINA - Numerous on cantaloups and cucumbers, Clemson area. (Purser). WISCONSIN - Heavy infestations of cucumbers most sections. (Wis. Ins. Bul.).

THRIPS - NEW JERSEY - Becoming more numerous on bulb onions in much areas of northern area. (Ins. -Dis. News.).

ONION MAGGOT (Hylemya antiqua) - IDAHO - Severe numbers in Parma area. (Scott).

ONION THRIPS (Thrips tabaci) - COLORADO - Damaging corn, beans and cucumbers in Adams County. (Ext. Serv.). NEVADA - Developing rapidly in most onion fields. (Gallaway, July 7). NORTH DAKOTA - In commercial field, 25 percent of plants infested with 2 thrips per plant. (N. D. Ins. Rept.).

HARLEQUIN BUG (Murgantia histrionica) - TENNESSEE - Large numbers on cole crops. (Mullett).

MELON APHID (Aphis gossypii) - OKLAHOMA - Populations on watermelons in Purcell-Pauls Valley area light to moderate. Some isolated damage. Most growers spraying. (Coppock).

SWEETPOTATO FLEA BEETLE (Chaetocnema confinis) - LOUISIANA - Populations average 25 adults per 100 sweeps in three fields in St. Landry Parish. (Oliver).

ORANGE TORTRIX (Argyrotaenia citrana) - OREGON - Very common on tender growth of boysenberries and blackberries in Polk and Marion Counties. Serious potential of damage later in bearing period. (Stephenson).

GRASSHOPPERS - TEXAS - Medium widespread populations on vegetables in Motley County. (Pallmeyer). Heavy local populations on gardens in Palo Pinto County. (Lindsey). VIRGINIA - Heavy on garden crops in some areas of Madison County. (McLearen, Wilkins). DELAWARE - Foliage damage to tomatoes and peppers some places. (Milliron).

FOUR-LINED PLANT BUG (Poecilocapsus lineatus) - PENNSYLVANIA - More abundant than past several years in Centre County. Infesting chrysanthemum and rhubarb. (Adams, July 2).

RASPBERRY CANE BORER (Oberea bimaculata) - WISCONSIN - Girdling new raspberry canes, week ending July 1 in Eau Claire, Chippewa, Barron, Iron and Douglas Counties. (Wis. Ins. Bul.).

TWO-SPOTTED SPIDER MITE (Tetranychus telarius) - WASHINGTON - Adults highly active and abundant on mint fields in Yakima and Benton Counties. Control not effective. (Kamal, Menke).

## TOBACCO INSECTS

HORNWORMS (Protoparce spp.) - NORTH CAROLINA - Oviposition started in east central counties with as many as 4 eggs per 25 plants.(Farrier). . Average of 1 percent eggs and 12 percent larvae on plants in Chowan County and general infestation in Hoke County. (Overman, Gilliam). GEORGIA- Moderate infestations on tobacco in Colquitt, Cook and Berrien Counties. (Johnson). MARYLAND - First brood one of most destructive on record. Unprotected fields from 90 to 100 percent damaged. Infestations general and heavy in all tobacco-growing counties. Treatment general. Principal species to date P. quinquemaculata.(U. Md., Ent. Dept.).

BUDWORMS (Heliothis spp.) - NORTH CAROLINA - Average of 25 percent of plants attacked in Chowan County. (Overman). General infestations Pamlico and Hoke Counties. (Stoval, Gilliam). Less than 0.5 percent examined in east central counties infested. (Farrier). MARYLAND - Light on tobacco in St. Marys County. (U. Md., Ent. Dept.).

CABBAGE LOOPER(Trichoplusia ni) -GEORGIA - Light to moderate infestations on tobacco in Colquitt, Cook and Berrien Counties. (Johnson).

GREEN PEACH APHID (Myzus persicae) - GEORGIA - Moderate infestations on tobacco in Colquitt and Cook Counties. Light infestation in Berrien County. (Johnson). MARYLAND - Very light on tobacco in Anne Arundel and Charles Counties. High temperatures caused considerable mortality. (U. Md., Ent. Dept.).

TOBACCO FLEA BEETLE (Epitrix hirtipennis) - GEORGIA - Light infestations on tobacco in Coffee, Jeff Davis, Toombs and Emanuel Counties. (Johnson).

STINK BUGS - TENNESSEE - Some injury on tobacco over State. (Mullett).

## COTTON INSECTS

BOLL WEEVIL (Anthonomus grandis) - NORTH CAROLINA - Twenty-two percent injured squares in Union County. (Spyhalski). Threatening in areas where little activity noted earlier. (Cott. News. Lett.). SOUTH CAROLINA - Average infestation in treated fields 8 percent, untreated 25 in 34 counties, July 9. (Cott. Lett.). Nine treated fields in Florence County had 7 percent infestation and untreated check areas in 7 fields had 23 percent. Fourteen percent infestation in 69 treated fields in Darlington County. (Walker, et al.). TENNESSEE - Considerable damage in heavily infested western counties. Counts made along Mississippi border showed 28 percent infestation against 35 last week and 5 at this time in 1955. Conditions continue favorable. (Locke). ALABAMA - Thirty-four fields examined in 8 northeastern counties and all found infested at rate of 21 percent. (Tyus). GEORGIA - Thirty-four percent infestation in 47 fields in northwest and southern areas. (Johnson). MISSISSIPPI - Generally present in cotton fields with first-generation weevils increasing. Apparently more difficult to control in some fields in south delta. Infestations still spotted in northern section. (Hutchins). Average infestation for all fields examined in delta counties was 16.2 percent compared with 10.1 at same time last year. Punctures increasing following emergence of first-generation weevil. (Merkl, Furr et al.). LOUISIANA - Generally declined some from last week. Percent infestation by parish: 33 in 10 fields in Tensas, 27 in 17 fields in Natchitoches, 45 in 13 fields in Bossier, 21 in 3 fields in Caddo, 52 in 5 fields in Ouachita Parish. (Oliver). Total of 120 fields examined in Tallulah area and all found infested at rate of 27 percent compared with 22 last week. Infestation increasing some fields. (Gaines, Pfrimmer, et al.). ARKANSAS - First-generation emergence underway. Average infestation by areas this week and last: southeast 6.5 percent and 8 percent, east central 3.9 and 4.1, northeast 4.5 and 5.8, central 20 and 30.2, southwest 20.5 and 39.6. (Warren, Harrendorf, Barnes). TEXAS-Still damaging young bolls in lower Rio Grande Valley. (Deer). Light to heavy in upper coastal area, east and northeast areas. Increasing in central areas. (Turney, Martin, July 10). MISSOURI - Remains very light. (Kyd, Thomas). OKLAHOMA - Treated fields in Tulsa, Wagoner, and Muskogee Counties had infestation of 2-5 percent. Average infestation of 3-9 percent in central counties. (Coppock).

BOLLWORMS (Heliothis spp. et al.) -NORTH CAROLINA - Appearing in many counties but not yet general threat to cotton crop. (Cott. New Lett.). SOUTH CAROLINA - Situation easing somewhat July 9. (Cott. Lett.). Less than 1 percent infestation in 6 fields in Florence County. (Walker, et al.). TENNESSEE - Some damage in scattered fields in west Tennessee. (Locke). ALABAMA - Three percent infestation found in 8 northeastern counties. (Tyus). GEORGIA - Average of 2 larvae per 100 terminals in 47 fields in northwest and southern counties. (Johnson). MISSISSIPPI - Light to medium infestations with moth flights increasing in northern area. (Bennett). Very few eggs or larvae reported in delta counties. (Merkl, Furr et al.). LOUISIANA - Remain low but considerable moth activity and larvae and eggs increasing. (Oliver). Average of 2.6 eggs per 100 terminals in 120 fields in Tallulah area and 2.1 larvae in 116 fields. (Gaines, Pfrimmer et al.). ARKANSAS - New brood of moths due. Some local spots heavily infested. (Warren, Harrendorf, Barnes). TEXAS - Continued to increase, especially in fields where cotton is green and succulent. (Turney, Martin, July 10). ARIZONA - Appearing in Cochise and Maricopa Counties. (Roney). MISSOURI - Egg and larval counts rose sharply, from 0-17 eggs and 0-16 larvae per 100 terminals. (Kyd, Thomas). OKLAHOMA - Increasing in some fields in Muskogee County, 6 larvae per 100 squares. Low elsewhere. (Coppock).

SPIDER MITES - NORTH CAROLINA - Tetranychus atlanticus severe locally on cotton in Sampson County. (Jones, Farrier). Spotted in most areas. (Cott. News Lett.). SOUTH CAROLINA - Increasing in Lexington, Marlboro and York Counties. (Cott. Lett.). ARKANSAS - Local infestation appearing in several areas of eastern counties. (Warren, Harrendorf, Barnes). TEXAS - Increasing in most areas. (Turney, Martin, July 10). ARIZONA - Rather high in eastern Maricopa County. (Roney).

APHIDS - GEORGIA - Aphis gossypii light to moderate in 12 counties. Heavy in Washington County. (Johnson). MISSISSIPPI - Light in a few fields in delta counties. (Merkl, Furr et al.).

FLEAHOPPERS - OKLAHOMA - From 0-12 per 100 terminals for east central area. (Coppock). MISSOURI - About 11 per 100 terminals in 416 fields. (Kyd, Thomas). ALABAMA - Light in northeastern area. (Tyus). TEXAS - Injurious numbers in isolated fields. (Turney, Martin, July 10.).

LYGUS BUGS - ARIZONA - Building up in Pima and Graham Counties. Heavy numbers some fields of Maricopa County. (Roney).

COTTON LEAFWORM (Alabama argillacea) - TEXAS - Pupa collected from cotton in San Patricio County, June 21. First adult in light trap at Weslaco June 20. (Turney, Martin, July 10).

CABBAGE LOOPERS - TEXAS - Increasing in most areas and causing some leaf injury in south central and west areas. (Turney, Martin, July 10).

A WHITE GRUB (Phyllophaga ephilida) - NORTH CAROLINA - Completely destroyed 5 acres of cotton in Union County, 20 or more larvae per square foot. (Mistric, Dogger).

## FOREST, ORNAMENTAL AND SHADE TREE INSECTS

FALL WEBWORM (Hyphantria cunea) - OKLAHOMA - Populations heavy in east central area. Damage to pecans in Sequoyah County light to moderate. From 5 to 45 large colonies per pecan tree in Asher-Konowa area. Some young persimmon trees in Pontotoc and Hughes Counties completely defoliated. (Coppock). LOUISIANA - Continues to attack and defoliate pecan, persimmon, wild cherry and ash trees over State. (Oliver). GEORGIA - General throughout State on pecan, hickory and cherry trees. (Johnson, Milner). MARYLAND - Webbing on boxelder and oaks on the lower Eastern Shore. (U. Md., Ent. Dept.). ALABAMA - Attacking pecan trees in Lee and Elmore Counties. (Robertson). ARKANSAS - Infestations locally heavy in eastern edge of Ozark Plateau. Up to 30 colonies counted on infested trees. Some trees in southwest area completely defoliated. DELAWARE - Injurious to sweetgum, oaks and other trees generally. (Milliron). WISCONSIN - First report of year, Rock County. (Wis. Ins. Bul.).

FOREST TENT CATERPILLAR (*Malacosoma disstria*) - WIS. - Moderate to severe defoliation in Douglas, Bayfield, Ashland and Iron Counties. Most larvae pupated. Heavy parasitism in Ashland County. (Wis. Ins. Bul.).

JACK-PINE BUDWORM (*Choristoneura pinus*) - MINNESOTA - Adult emergence underway central, west-central and northwest areas. Populations down in areas where damage heaviest in 1954 and 1955. Some damage near Park Rapids and Bemidji. Most extensive damage between Jenkins and Brainerd in central area. (Minn. Ins. Rept.). WISCONSIN - Light to medium infestations in Marinette County. Pupation nearly complete in northwest. Damage conspicuous in heavily infested areas of Polk, Douglas, Washburn and Oneida Counties. (Wis. Ins. Bul.).

LARCH SAWFLY (*Pristiphora erichsonii*) - MINNESOTA - Defoliation noticeable in north-central area. (Minn. Ins. Rept.). WISCONSIN - Light infestations in Vilas and Oneida Counties. Defoliation light in northwest. Some larvae cocooned. (Wis. Ins. Rept.).

SARATOGA SPITTLEBUG (*Aphrophora saratogensis*) - WISCONSIN - Heavy infestations in Vilas County; light infestation in Langlade, Oneida and Marinette Counties. (Wis. Ins. Rept.).

PINE SPITTLEBUG (*Aphrophora parallela*) - MINNESOTA - Adults emerging in central area. (Minn. Ins. Rept,). WISCONSIN - Common in jack pine in Vilas, Shawano and Marinette Counties. (Wis. Ins. Bul.).

EUROPEAN ELM SCALE (*Gossyparia spuria*) - KANSAS - Heavy populations in Oberlin, Decatur County. (Brady, Long). WISCONSIN - Infestations appear heaviest for several years in Dane, Jefferson, Rock and Milwaukee Counties. (Wis. Ins. Bul.).

ENGRAVER BEETLES (*Ips* spp.) - ARKANSAS - Some build up beginning of July in southwest area. (Ark. State For. Comm.).

ENGLEMANN SPRUCE BEETLE (*Dendroctonus engelmanni*) - COLORADO - Peak emergence June 24-July 7. (For. Ent. Lab.).

ELM LEAF BEETLE (*Galerucella xanthomelaena*) - NEW JERSEY - Considerable leaf injury in central area. Apparently not quite as heavy as in 1955. (Ins.-Dis. News.). RHODE ISLAND - Browning leaves of elms in Johnston. (Steve). ARKANSAS - Egg deposition heavy; third-generation larvae appearing. (Warren, Harrendorf, Barnes).

PINE GALL WEEVIL (*Podapion gallicola*) - DELAWARE - Injury prevalent on Virginia pine at Petersburg. (Milliron).

MITES - NORTH DAKOTA - Light to medium infestations on spruce and juniper nursery plantings through northwestern area. (N. D. Ins. Rept.). MINNESOTA - Damaging evergreens over State. (Minn. Ins. Rept.).

MIMOSA WEBWORM (*Homadaula albizziae*) - NEW JERSEY - Becoming active in southern areas. (Ins. -Dis. News.). MARYLAND - Generally heavy on mimosa. (U. Md., Ent. Dept.). MISSOURI - Heavy infestations general in southeast counties. (Kyd, Thomas). VIRGINIA - Heavy on mimosa trees in Keysville and locations in Lunenburg County. (Peery, Harding).

LOCUST LEAF MINER (*Chalepus dorsalis*) - MARYLAND - Heavy on locust in all sections. (U. Md., Ent. Dept.). VIRGINIA - Generally heavy in black locust along highway 11 from Roanoke to Winchester and in Page, Culpeper and Botetourt Counties. (Morris).

BLACK TURPENTINE BEETLE (*Dendroctonus terebrans*) - ARKANSAS - Activity in every pine growing section of State. (Ark. State For. Comm., June Rept.).

BLACK HILLS BEETLE (*Dendroctonus ponderosae*) - COLORADO - Infestations low in San Isabel and Huerfano Counties in spite of early emergence. (For. Ent. Lab.).

ELM LEAF MINER (*Fenusa ulmi*) - WISCONSIN - Early populations quite heavy in Milwaukee County. (Wis. Ins. Bul.).

ELM LEAF APHID (*Myzocallis ulmifolii*) - DELAWARE - Very abundant and injurious on American elm near Smyrna. (Milliron). WISCONSIN - Populations moderate in Dane, Jefferson and Milwaukee Counties. (Wis. Ins. Bul.).

WALNUT CATERPILLAR (*Datana integerrima*) - VIRGINIA - Seriously damaging foliage of walnut trees in some areas of Prince Edward County. (Striplin).

A TENT CATERPILLAR (*Malacosoma fragilis*) - COLORADO - Heavy defoliation to aspen in Huerfano County in San Isabel National Forest. (For. Ent. Lab.).

WEBWORMS - TEXAS - Medium local populations on shade trees in Motley County. (Pallmeyer). DELAWARE - *Salebria afflictella* and *Tetralopha melanogrammos* causing severe injury to ornamental sweetgum several places. Less destructive in forest plantings. (Milliron).

WHITE-MARKED TUSSOCK MOTH (*Hemerocampa leucostigma*) - DELAWARE - Very abundant on sycamore at Smyrna. (Milliron).

STINK BUGS - TEXAS - Heavy widespread on mesquite and many ornamentals in Bailey County. (Adams).

SPIREA APHID (*Aphis spiraecola*) - UTAH - Damage abundant in northern area. (Knowlton).

SADDLED PROMINENT (*Heterocampa guttivitta*) - DELAWARE - Numerous on white oak in Redden State Forest. (Milliron).

NORWAY MAPLE APHID (*Periphyllus lyropictus*) - PENNSYLVANIA - General and fairly heavy on maple in northeastern area. (Gesell).

JAPANESE BEETLE (*Popillia japonica*) - MARYLAND - Causing concern on ornamentals and shade trees in most sections. Particularly abundant in St. Marys County. (U. Md., Ent. Dept.).

IMPORTED WILLOW LEAF BEETLE (*Plagiodera versicolora*) - PENNSYLVANIA - Injury beginning to show at State College on willow. (Udine, July 8).

COTTONY-MAPLE SCALE (*Pulvinaria innumerabilis*) - IDAHO - Moderate to heavy infestations on ash trees in Parma area, Canyon County. (Scott).

BAGWORM (*Thyridopteryx ephemeraeformis*) - DELAWARE - Abundant on sycamore and evergreens some places. (Milliron). VA. - Heavy on evergreens in scattered areas of Bedford County. (Boone).

ASIATIC OAK WEEVIL (*Cyrtepistomus castaneus*) - DELAWARE - Adults abundant on oaks and chinquapin in several areas. (Milliron).

APHIDS - IDAHO - Generally above normal infestations throughout southeastern area on ornamentals. (Portman). UTAH - Bark and needle infestations conspicuous on yellow pine in Uintah mountains. (Knowlton).

CUTWORMS - WASHINGTON - Considerable injury and defoliation to *Narcissus* near Mount Lynden. (Karmal, Eide).

AN AZALEA CATERPILLAR (*Datana major*) - FLORIDA - Early instars causing partial defoliation of azalea plants at Gainesville, Alachua County. First report of year. (Hetrick).

## INSECTS AFFECTING MAN AND ANIMALS

TABANIDS - UTAH - Horse and deer flies very troublesome in parts of Wellsville and Uintah Mountains. Apparently above normal populations in many localities. (Knowlton). IDAHO - Horse flies above average populations throughout southeastern area. (Portman).

HORN FLY (*Siphona irritans*) - OKLAHOMA - Populations vary from 500-1500 on untreated cows and steers; 2000 to 5000 on bulls in north central area. (Howell). UTAH - Becoming troublesome in many areas. (Knowlton). KANSAS - Infestations ranged from 200-300 per animal in herd in Geary County. Increase in this area. (Matthew). PENNSYLVANIA - Up to 500 per heifer on pasture in Wyoming County. (Gesell).

MOSQUITOES - IDAHO - Above average populations in southeastern area. (Portman). UTAH - Much annoyance in Rich, Daggett, Uintah, Duchesne, Summit and Morgan Counties. (Harmston, Ogden, Knowlton).

BOT FLIES - UTAH - Annoying cattle and horses in meadow areas. (Knowlton).

LONE STAR TICK (Amblyomma americanum) - OKLAHOMA - From 3 to 5 replete ticks on cattle in Muskogee County; larvae and nymphs active. (Howell).

CHIGGERS - SOUTH CAROLINA - Extremely troublesome in Clemson area. (Nettles).

## STORED PRODUCTS INSECTS

STORED GRAIN INSECTS - ARKANSAS - In Stuttgart-DeWitt area, 380 grain bins were examined in June. The number of bins infested and species concerned were as follows: Rice weevil - 4; flour beetles - 4; saw-toothed grain beetle - 69; flat grain beetle - 5; Angoumois grain moth - 8; Indian-meal moth - 2; lesser grain borer - 11; cadelle - 16; miscellaneous species - 100. (Warren, Harrendorf, Barnes).

## BENEFICIAL INSECTS

A BRACONID (Helcon pedalis) - RHODE ISLAND - Emerging in spectacular numbers from cedar pole fence in Providence. Known as parasite of cerambycids. (Mathewson).

LADY BEETLES - IDAHO - General in fields and roadsides throughout southeastern area. Ratio of adults to larvae average about three to one. (Portman).

AN ALKALI BEE (Nomia melanderi) - IDAHO - First adults of season near Marsing. (Barr). OREGON - Greater than 90 percent parasiticism of Nomia melanderi by a bombyliid in Adrian area of Malheur County. (Stephen).

## MISCELLANEOUS INSECTS

EUROPEAN EARWIG (Forficula auricularia) - IDAHO - General in Aberdeen area and heavy infestations in Parma area around homes and gardens. (Gittins, Scott).

YELLOW JACKETS - TENNESSEE - Unusual numbers in State. (Mullett).

## ADDITIONAL NOTES

IOWA - GRASSHOPPERS dominant insect pest in Iowa. Adults in southern and central areas. Control activities progressing. EUROPEAN CORN BORER populations vary from 40 to 300 or more per 100 plants with highest infestation in east central area. Development furthest along in Ankeny area. Second brood emergence will be drawn out, but may be concentrated in local areas. NORTHERN CORN ROOTWORM adults evident in central area July 11. CORN LEAF APHID abundant in many tassels in some localities. POTATO LEAFHOPPER population building up in new legume seedlings and adult CLOVER LEAF WEEVIL present throughout southern half of State. GREEN-STRIPED MAPLEWORM defoliating maple trees in localized spots in central area. MOSQUITOES abundant over State and HORN FLY worst pest of livestock. (Harris).

WEST VIRGINIA - JAPANESE BEETLE feeding on various hosts over State. EUROPEAN RED MITE damage to apple in eastern panhandle evident, and SPIDER MITE populations on apple increasing in Hampshire County. APPLE APHID feeding injurious to apple in Jefferson County. (Dorsey, Hansen, Hamstead).

NEW YORK - TARNISHED PLANT BUG injury severe in a number of peach orchards in western area, and ORIENTAL FRUIT MOTH coming out in large numbers. Some FALL ARMYWORM damage to corn tassels in Suffolk and Nassau Counties. ARMYWORM moths sharply increased and some larvae on corn in Hudson Valley. Expecting something of an outbreak. EUROPEAN CORN BORER unusually heavy in Rockland County. Causing serious concern in Ulster County, and general heavy populations in southeastern area. Infestation severe in Erie County. STRIPED CUCUMBER BEETLE in large numbers Herkimer County. (N. Y. Wkly. Rept.).

MASSACHUSETTS - CORN EARWORM larvae feeding in whorls in Plymouth County. CABBAGE CATERPILLARS in all stages on cole crops. (Crop. Pest Cont. Mess.).

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Weather continued from p.690: mainly as showers with weekly amounts varying widely. In the West totals for the week were light except for much of California, Nevada, and Texas where no significant precipitation was reported, and in contrast, a few locations where local showers were extremely heavy. Throughout the week numerous destructive storms occurred. Nez Perce, Idaho reported a fall of 2 1/2 inches of rain and hail in one hour on July 13 with crop damage from Craigmont to Nez Perce estimated at $1,000,000. Lightning storms resulted in small forest fires in eastern Oregon and parts of Idaho during the period. Crop damage by hail was widely scattered with near $900,000 destruction reported in Woodbury County, Iowa on July 11. (Summary Supplied by U. S. Weather Bureau).

# LIGHT TRAP COLLECTIONS

| | Pseud. | Agrotis | Prod. | Perid. | Feltia | Heliothis | | Protoparce | | Laphyg. |
|---|---|---|---|---|---|---|---|---|---|---|
| | unipun. | ypsilon | ornith. | marg. | subt. | zea | viresc. | sexta | quinq. | frugip. |
| SOUTH DAKOTA | | | | | | | | | | |
| Brookings 7/11-12 | 273 | 18 | | 1 | | | | | | |
| MISSOURI (County) | | | | | | | | | | |
| Boone 7/7-13 | 42 | 8 | | 7 | | 12 | | 1 | | |
| KANSAS | | | | | | | | | | |
| Manhattan 7/9-13 | 1 | | 28 | | | 21 | | 4 | 19 | |
| TEXAS | | | | | | | | | | |
| College Station 7/3-9 | | 1 | 60 | 1 | | 407 | 2 | | | 63 |
| Weslaco 6/16-30 | 108 | 8 | 64 | 14 | | 4391 | 221 | | | 191 |
| Waco 7/7-13 | 1 | 9 | 2 | 15 | 3 | 1135 | | | | |
| ARKANSAS | | | | | | | | | | |
| Hope 7/6-12 | | | | | | 156 | | | | |
| Stuttgart 7/5-11 | 1 | 3 | | 2 | | 1 | | | | |
| Van Buren 7/5-11 | | | | | | 34 | | | | |
| Varner 7/5-11 | | 22 | | | | 34 | | | | |
| Fayetteville 7/7-13 | 43 | 11 | | 13 | | 97 | | | | |
| Clarksville 7/3-10 | 5 | 23 | | 4 | | 80 | | | | |
| LOUISIANA | | | | | | | | | | |
| *Tallulah 7/6-12 | 36 | 10 | 354 | 1 | 258 | 407 | 19 | 96 | 2 | 41 |
| Franklin 7/5-11 | 6 | | 99 | | 8 | 4 | | | | 29 |
| Baton Rouge 7/7-13 | 17 | 3 | 180 | | 90 | 25 | | 36 | | 58 |
| Curtis 7/1-7 | | | 7 | | 7 | 5 | | 13 | | |
| MISSISSIPPI (Counties) | | | | | | | | | | |
| *Washington 7/6-12 | 195 | 17 | | 14 | | 452 | | | | |
| Coahoma 7/7-13 | 8 | 34 | 198 | 7 | 13 | 267 | 3 | | | |
| Humphreys | | 27 | 480 | 5 | 27 | 245 | 6 | | | |
| Lauderdale | | 1 | 13 | | | 6 | | | | |
| Marshall | 5 | 22 | 196 | 7 | 11 | 37 | | | | |
| Oktibbeha | 19 | 17 | 604 | 5 | 42 | 11 | 2 | | | |
| TENNESSEE (Counties) | | | | | | | | | | |
| Shelby 7/3-9 | 14 | 3 | 51 | | | 10 | | 14 | | |
| Madison | 64 | 4 | 52 | 4 | | 126 | | 5 | | |
| Lawrence | 56 | 12 | 20 | 26 | | 20 | | 5 | | |
| Maury | 32 | 8 | 32 | 16 | | 16 | | 10 | | |
| Robertson | 76 | 12 | 48 | 20 | | 36 | | 48 | 3 | |
| Cumberland | 32 | 8 | 24 | 16 | | 6 | | 15 | | |
| Knox | 6 | 4 | 46 | 10 | | 20 | | 4 | | |
| Greene | 32 | 8 | 48 | 48 | | 8 | | 52 | | |
| Blount | 24 | | 52 | 12 | | 28 | | 2 | | |
| Johnson | 478 | 88 | 116 | 192 | | 20 | | 16 | | |
| ALABAMA | | | | | | | | | | |
| Auburn 7/1-11 | | | 284 | | | | | | | |
| GEORGIA (Counties) | | | | | | | | | | |
| Clarke 7/4-10 | | 27 | | | | 4 | 2 | 6 | 18 | |
| Spalding 7/6-12 | 8 | 1 | 65 | 12 | 92 | 23 | 4 | 5 | 2 | 6 |
| Tift 7/6-12 | 16 | 66 | 81 | | 69 | 405 | 7 | 68 | | 6 |
| FLORIDA | | | | | | | | | | |
| Gainesville 7/5 | | | 1 | | | 7 | | 5 | | |
| SOUTH CAROLINA (Counties) | | | | | | | | | | |
| Florence 6/30-7/6 | 8 | 11 | 12 | 6 | 462 | 401 | 11 | 144 | 2 | |
| Charleston 6/25-7/1 | 5 | 11 | 12 | | 26 | 3 | 1 | | | |
| Oconee 7/1-7/7 | 15 | 1 | 99 | 1 | 75 | 12 | 2 | 6 | 2 | |
| NORTH CAROLINA (Counties) | | | | | | | | | | |
| Johnson 7/11-12 | | 2 | 12 | | 10 | 5 | 2 | 12 | 20 | |
| Duplin 7/11-12 | 1 | | 20 | | 5 | 2 | 1 | 6 | 23 | |
| VIRGINIA (County) | | | | | | | | | | |
| *Pittsylvania | | | | | | | | 31 | 50 | |
| OHIO (County) | | | | | | | | | | |
| Athens 7/2-8 | 50 | 18 | | | | | | | | |
| INDIANA (Counties) | | | | | | | | | | |
| Tippecanoe 7/7-12 | 22 | 1 | 9 | 12 | | | | 1 | 1 | |
| Lawrence 7/7-10 | 59 | 7 | 14 | 27 | | 6 | | 13 | 7 | |
| ILLINOIS | | | | | | | | | | |
| Urbana 7/6-12 | 183 | 6 | 25 | 73 | | | | 5 | | |
| WISCONSIN | | | | | | | | | | |
| DeForest 7/2-9 | 137 | | | | | 33 | | | | |
| MINNESOTA (County) | | | | | | | | | | |
| Ramsey 7/6-8 | 63 | 13 | | | | | | | | |

Other Collections: South Dakota (Brookings, 7/11-12) *Chorizagrotis auxiliaris* - 360. Texas (Weslaco, 6/16-30) *Alabama argillacea* - 8; *Trichoplusia ni* - 14,388.
*Three traps Tallulah, La. and Pittsylvania Co., Va., Two traps Washington Co., Miss.

Uniform Survey Procedure Approved By
The Lake States Forest Insect Survey Committee - 1956

## JACK-PINE BUDWORM SURVEYS

### PURPOSE:

The jack-pine budworm, Choristoneura pinus Freeman, is a serious problem in natural jack pine stands throughout the Lake States. Since its identification in 1923, it has caused the mortality of substantial volumes of merchantable jack pine and vast numbers of sapling and reproduction jack, red, and white pine growing in the understory. Outbreaks of this insect occur periodically at intervals of from 6 to 8 years and last for 2 to 4 years.

During the recent (1949-1952) budworm outbreak in the Lower Peninsula of Michigan, survey techniques were developed by the U. S. Bureau of Entomology and Plant Quarantine in cooperation with the Forest Service and the Michigan Conservation Department, for evaluating the infestation. Inasmuch as the insect was widely distributed and present in varying degrees of intensity throughout the jack-pine type, surveys to detect its presence or absence were not deemed necessary. Procedures to appraise the seriousness of infestations and to estimate loss of the forest resource were designed and field tested. The methods and procedures found satisfactory are presented here.

### INSTRUCTIONS:

#### Appraisal Survey

Appraisals of the seriousness of known jack-pine budworm infestations in Michigan and Wisconsin are conducted after defoliation is completed and before the damage (clipped) foliage has fallen from the trees. The following procedure is designed to enable the rapid evaluation of an infestation over a rather large area in a minimum of time. No attempt is made to collect information relative to stand composition or site quality.

A series of temporary roadside observation stations each located in jack-pine type at intervals of approximately 1 mile along the major transportation routes throughout the infestation area are established. The severity of budworm defoliation of the general stand is estimated at or beyond 200 feet from the road right-of-way. Criteria of defoliation employed are as follows:

1. None - No budworm defoliation evident on trees or reproduction. Crowns of canopy green. No budworm cast pupal skins on trees or reproduction.

2. Light - No budworm defoliation evident, or barely evident on trees. Crowns of canopy green.. Budworm defoliation evident on understory reproduction. Leaders and laterals of understory trees not webbed together. Budworm cast pupal skins present on trees or reproduction.

3. Medium - Budworm defoliation evident on trees. Crowns of canopy predominantly green but with brownish to reddish background. Defoliation of understory reproduction evident. Leaders and laterals of understory trees webbed together. Cast pupal skins present on trees and understory reproduction.

4. Heavy - Budworm defoliation evident on trees to complete defoliation. Crowns of canopy predominantly reddish brown. Budworm defoliation of understory reproduction severe to complete. Leaders and laterals of understory trees webbed together. Cast pupal skins present on trees and understory reproduction.

The survey form below will be used to record the necessary data at each observation station.

The stations will be numbered consecutively and the mileage or distance from a landmark noted. Each station will be located by township, range, and section, and, if possible, by quarter section.

The degree of overstory and understory defoliation should be estimated and the presence of lateral-terminal webbing and cast pupal skins noted. The severity of general infestation should also be noted. Any other observations on stand conditions, etc., can be made in the space provided for remarks at the botton of the form.

A narrative report, summarizing the findings of the survey, will include the methods employed, a map indicating categories of defoliation severity by acreages, and general conclusions and recommendations.

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JACK-PINE BUDWORM - DEFOLIATION APPRAISAL SURVEY

| Station number | Mileage from landmark | Location | | | | Overstory defoliation | | | | Understory defoliation | | | | | Cast pupal skins | | Severity of infestation | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | T | R | S | Q | N | L | M | H | N | L | M | H | L-T webbing | Understory | Overstory | N | L | M | H |
| | | | | | | | | | | | | | | | | | | | | |
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Remarks:

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## Aerial Surveys

An evaluation of jack-pine budworm infestations from the air is conducted by examining infestations along predetermined flight lines established at uniform intervals of from 1 to 12 miles. Random or meandering flights along the boundary of known infestations also are used in aerial surveys. The operation recorder probably would be of material help for use in recording infestations in this region from the air.

In the conduct of the aerial survey for the jack-pine budworm the following steps are taken:

1. Areas of known infestation intensity are located on the ground and flown over to acquaint observers with known intensity of budworm defoliation.

2. Criteria of abundance employed.

   a. None-light - No defoliation evident. Crowns normal green.

   b. Medium - Defoliation evident. Crowns predominantly green with brownish background.

   c. Heavy - Defoliation evident. Crowns predominantly reddish brown.

3. Airplane. A single-engine, high-wing airplane, such as the Cessna 170-B or Cessna 180, gives very satisfactory performance, with ample room for two observers. The flight lines should be 1 - to 12 - mile grids, along north-south or east-west lines, and the altitude should be 500 to 1, 000 feet.

4. Mapping. County, Highway, Cover Type, or Aerial Navigation maps can be used--a scale of 1/2 inch or 1 inch per mile is preferable, if available. The general location of defoliation can be sketched in by foregoing criteria.

5. Report. This should be incorporated with a ground survey.

## Timber Drain Survey

An appraisal of the loss of timber caused by budworm feeding in Michigan and Wisconsin is conducted after defoliation is completed, generally in mid-August, or early September. The following general procedure is followed:

1. The area of infestation is determined from reconnaissance survey maps and the area of each category of severity of defoliation is computed.

2. The number of evaluation plots required is determined from the Intensity of Sampling statement prepared for the Lake States Forest Insect Survey Committee (see CEIR 6(28):675). This number is based on the standard of accuracy required, the density and uniformity of the stand, the value of the stand, and the acreage to be sampled.

3. Plot location and procedure.

   a. Two or three men will comprise a crew. Note the mileage from a definite landmark: river, crossroad, or estimated distance if cruising or walking. If the survey is conducted by road the plots should be approximately 5 chains from the road right-of-way.

   b. The plots should be 1/5 acre, with a convenient tree as the center. Plot examination should be by sectors, using two plastic ropes, each 52. 7 feet long. Tree diameter will be taken by diameter tape or cruiser's stick. The number of logs can be determined by cruiser's stick or by estimation. Reproduction can be determined by actual tally.

4. Tree tally. Using the Cumulative Tree Tally Form 99-R9 (Rev. 6/17/47) record trees by species and diameter class--2-inch saplings, 4-inch saplings, 6-inch and over merchantable poles, and reproduction. A record of the health class should also be made by (a) living, (b) dead - budworm killed, and (c) dead - (suppressed) budworm killed).

5. A summary report should be prepared to show methods employed, area surveyed, summary of losses, general conclusions, and recommendations and predictions.

D. M. Benjamin, University of Wisconsin

Form 99 R-9

| | | | | | |
|---|---|---|---|---|---|
| DBH | | | | | |
| 2" | | | | | |
| 4" | | | | | |

# CUMULATIVE 1/5 ACRE TALLY SHEET

ESTIMATOR ____________ DATE ____________
COURSE ____________ PLOT ____________ SEC. ____________ T. ________ R. ________

MAP TYPE
PLOT TYPE

NUMBER OF 8-FOOT BOLTS (4" OR LARGER) PER TREE

VOLUME IN TENTHS OF CORDS PER ACRE

| DBH | SPEC. & LEGEND | NON-MERCH. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| 6 | | | 1 2 3 4 5 6 6 7 8 9<br>10 11 12 13 14 15 16<br>17 18 18 19 20 21<br>22 23 24 25 26 27 | 1 3 4 6 7 9 10 12 13 15 16<br>18 19 21 22 24 25 27 28<br>30 31 33 34 36 37 39 40<br>42 43 45 46 48 49 51 52 | 2 4 6 9 11 13 15 17 19 22<br>24 26 28 30 32 35 37 39 41<br>43 45 48 50 52 54 56 58 60<br>63 65 67 69 71 73 76 78 80 | 3 6 9 12 14 17<br>20 23 26 29 32<br>35 37 40 43 46 49<br>52 55 58 60 63 66 | | | |
| | | | 1 2 3 4 5 6 6 7 8<br>9 10 11 12 13 14<br>15 16 17 18 18 19 | 1 3 4 6 7 9 10 12 13 15<br>16 18 19 21 22 24 25 27<br>28 30 31 33 34 36 37 39 | 2 4 6 9 11 13 15 17 19 22<br>24 26 28 30 32 35 37 39 41<br>43 45 48 50 52 54 56 58 60 | 3 6 9 12 14 17 20<br>23 26 29 32 35 37 40<br>43 46 49 52 55 58 60 | | | |
| | | | 1 2 3 4 5 6 6 7<br>8 9 10 11 12 13 | 1 3 4 6 7 9 10 12 13 15<br>16 18 19 21 22 24 25 27 | 2 4 6 9 11 13 15 17 19<br>22 24 26 28 30 32 35 37 | 3 6 9 12 14 17 20 23<br>26 29 32 35 37 40 43 46 | | | |
| | | | 1 2 3 4 5 6 6<br>7 8 9 10 11 12 13 | 1 3 4 6 7 9 10 12 13 15<br>16 18 19 21 22 24 25 27 | 2 4 6 9 11 13 15 17 19<br>22 24 26 28 30 32 35 37 | 3 6 9 12 14 17 20 23 26<br>29 32 35 37 40 43 46 49 | | | |
| 8 | | | 2 3 5 6 8 10 11<br>13 14 16 18<br>19 21 22 24<br>26 27 29 30 | 2 5 7 10 12 15 17 20 22<br>25 27 30 32 35 37 40<br>42 45 47 50 52 55 57<br>60 62 64 67 69 72 74 | 3 7 10 14 17 21 24 28<br>31 35 38 42 45 49 52 56<br>60 63 66 70 73 77 80 84<br>87 91 94 98 101 105 108 | 5 9 14 18 23 28 32 37 41<br>46 51 55 60 65 69 74 78<br>83 88 92 97 101 106 111<br>115 120 124 129 134 138 | 6 12 17<br>23 29 35<br>41 46 52 58<br>64 70 75 81 | 7 14<br>21 28<br>34 41 48<br>55 62 69 | AVERAGE PERCENT DEFECT<br>POLES |
| | | | 2 3 5 6 8 10<br>11 13 14 16<br>18 19 21 22 | 2 5 7 10 12 15 17 20<br>22 25 27 30 32 35 37<br>40 42 45 47 50 52 55 | 3 7 10 14 17 21 24 28<br>31 35 38 42 45 49 52 56<br>60 63 66 70 73 77 80 84 | 5 9 14 18 23 28 32 37 41<br>46 51 55 60 65 69 74 78<br>83 88 92 97 101 106 111 | 6 12 17 23<br>29 35 41 46<br>52 58 64 70 | 7 14 21<br>28 34 41<br>48 55 62 | |
| | | | 2 3 5 6 8<br>10 11 13 | 2 5 7 10 12 15 17 20<br>22 25 27 30 32 35 37 | 3 7 10 14 17 21 24 28<br>31 35 38 42 45 49 52 56 | 5 9 14 18 23 28 32 37<br>41 46 51 55 60 65 69 74 | 6 12 17 23 29<br>35 41 46 52 58 | 7 14 21 28<br>34 41 48 55 | |
| | | | 2 3 5 6 8<br>10 11 13 | 2 5 7 10 12 15 17 20<br>22 25 27 30 32 35 | 3 7 10 14 17 21 24 28<br>31 35 38 42 45 49 52 | 5 9 14 18 23 28 32 37<br>41 46 51 55 60 65 69 74 | 6 12 17 23 29<br>35 41 46 52 58 | 7 14 21 28<br>34 41 48 55 | |
| 10 | | | 2 5 7 10<br>12 15 17<br>20 22 25 | 4 7 11 15 18 22 26<br>29 33 37 40 44 48<br>51 55 59 62 66 70 | 5 10 15 20 25 30 35 41<br>46 51 56 61 66 71 76<br>81 86 91 96 101 106 | 7 13 20 26 33 40 46 53<br>59 66 73 79 86 92 99 106<br>112 119 126 132 139 145 | 8 17 25 33 42<br>50 58 67 75 83<br>92 100 109 117 | 10 20 30 40 50<br>60 70 80 90 100<br>110 120 130 140 | 12 24 36 48<br>60 72 84 96<br>108 120 132 |
| | | | 2 5 7<br>10 12 15 | 4 7 11 15 18 22 26<br>29 33 37 40 44 48 | 5 10 15 20 25 30 35<br>41 46 51 56 61 66 71 | 7 13 20 26 33 40 46 53<br>59 66 73 79 86 92 99 106 | 8 17 25 33 42<br>50 58 67 75 83 | 10 20 30 40 50<br>60 70 80 90 100 | 12 24 36 48<br>60 72 84 96 |
| | | | 2 5 7<br>10 12 | 4 7 11 15 18 22 26<br>29 33 37 40 44 48 | 5 10 15 20 25 30 35<br>41 46 51 56 61 66 71 | 7 13 20 26 33 40 46 53<br>59 66 73 79 86 92 99 106 | 8 17 25 33 42 50<br>58 67 75 83 92 100 | 10 20 30 40 50 60<br>70 80 90 100 110 | 12 24 36 48<br>60 72 [illegible] 96 |
| | | | 2 5 7 | 4 7 11 15 18 22 | 5 10 15 20 25 30 35 | 7 13 20 26 33 40 46 53 | 8 17 25 33 42 50 | 10 20 30 40 50 60 | 12 24 36 48 |

MORTALITY / ACRE

| NO. TREES | | VOL BY SPECIES | | |
|---|---|---|---|---|
| 2" | 4" | SPEC. | CDS | BD FT. |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

TOTALS PER ACRE

NUMBER OF 16-FOOT LOGS (8" OR LARGER) PER TREE

VOLUME IN HUNDREDS OF BOARD FEET (SCRIBNER) PER ACRE

| DBH | SPEC. & LEGEND | NON-MERCH. | 1/2 | 1 | 1 1/2 | 2 | 2 1/2 | 3 | 3 1/2 | 4 | 4 1/2 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | | | 1 1 2 3 3 4 5<br>6 6 7 8 8 9 10<br>11 11 12 13 13<br>14 15 15 16 17 | 2 3 4 6 7 9 10 12 13<br>15 16 18 19 21 22 24<br>25 27 28 30 31 33 34<br>36 37 39 40 42 43 45 | 2 4 6 8 10 12 14 16<br>18 20 22 24 26 28 30<br>32 34 36 38 40 42 44<br>46 48 50 52 54 56 58 | | | | | | | |
| | | | 1 1 2 3 3 4 5<br>6 6 7 8 8 9 10<br>11 11 12 13 13 | 2 3 4 6 7 9 10 12 13<br>15 16 18 19 21 22 24<br>25 27 28 30 31 33 34 | 2 4 6 8 10 12 14 16<br>18 20 22 24 26 28 30<br>32 34 36 38 40 42 44 | | | | | | | |
| | | | 1 1 2 3 3 4 5<br>6 6 7 8 8 9 | 2 3 4 6 7 9 10 12<br>13 15 16 18 19 21 22 | 2 4 6 8 10 12 14 16<br>18 20 22 24 26 28 30 | | | | | | | |
| | | | 1 1 2 3 3 4 5 | 2 3 4 6 7 9 10 12 | 2 4 6 8 10 12 14 16 | | | | | | | |
| 12 | | | 1 3 4 6 7 8<br>10 11 13 14<br>15 17 18 20<br>21 22 24 25 | 2 5 7 10 12 14 17 19<br>22 24 29 29 31 34 36<br>38 41 43 46 48 50 53<br>55 58 60 62 65 67 70 | 3 7 10 13 16 20 23<br>26 30 33 36 40 43 46<br>50 53 56 59 63 66 69<br>73 76 79 82 86 89 92 | 4 8 12 16 20 23<br>27 31 35 39 43 47<br>51 55 58 62 66 70<br>74 78 82 86 90 94 | 5 10 15 19<br>24 29 34 39<br>44 48 53 58<br>63 68 73 78 | | | | | |
| | | | 1 3 4 6 7 8<br>10 11 13 14<br>15 17 18 20 | 2 5 7 10 12 14 17 19<br>22 24 29 29 31 34<br>36 38 41 43 46 48 | 3 7 10 13 16 20 23<br>26 30 33 36 40 43<br>46 50 53 56 59 63 | 4 8 12 16 20 23<br>27 31 35 39 43 47<br>51 55 58 62 66 70 | 5 10 15 19<br>24 29 34 39<br>44 48 53 58 | | | | | |
| | | | 1 3 4 6 7 8<br>10 11 13 14 | 2 5 7 10 12 14 17 19<br>22 24 29 29 31 34 | 3 7 10 13 16 20 23<br>26 30 33 36 40 43 | 4 8 12 16 20 23<br>27 31 35 39 43 47 | 5 10 15 19<br>24 29 34 39 | | | | | |
| | | | 1 3 4 6 7 8 | 2 5 7 10 12 14 17 19 | 3 7 10 13 16 20 23 | 4 8 12 16 20 23 | 5 10 15 19 24 | | | | | |
| 14 | | | 2 4 6 8 10 12<br>14 16 18 20<br>22 24 26 28 | 4 7 10 14 18 21 24<br>28 32 35 38 42 46<br>49 52 56 60 63 66 | 5 10 14 19 24 29 34<br>38 43 48 53 58 62<br>67 72 77 82 86 91 | 6 12 17 23 29 35<br>41 46 52 58 64 70<br>75 81 87 93 99 | 7 14 21 28<br>35 42 49 56<br>63 70 78 85 | 8 16 25 33<br>41 50 58<br>66 74 82 | 9 19<br>28 38<br>47 57 | | | |
| | | | 2 4 6 8 10 12<br>14 16 18 20 | 4 7 10 14 18 21 24<br>28 32 35 38 42 46 | 5 10 14 19 24 29 34<br>38 43 48 53 58 62 | 6 12 17 23 29 35<br>41 46 52 58 64 70 | 7 14 21 28<br>35 42 49 56 | 8 16 25 33<br>41 50 58 66 | 9 19<br>28 38 | | | |
| | | | 2 4 6 8 10<br>12 14 16 18 | 4 7 10 14 18 21 24<br>28 32 35 38 42 46 | 5 10 14 19 24 29 34<br>38 43 48 53 58 62 | 6 12 17 23 29 35<br>41 46 52 58 64 70 | 7 14 21 28<br>35 42 49 56 | 8 16 25 33<br>41 50 58 66 | 9 19<br>28 38 | | | |
| | | | 2 4 6 8 10 | 4 7 10 14 18 21 24 | 5 10 14 19 24 29 34 | 6 12 17 23 29 35 | 7 14 21 28 | 8 16 25 33 | 9 19 | | | |
| 16 | | | 3 5 8 11 14<br>16 19 22 24 | 5 9 14 19 23 28<br>33 37 42 46 51 56 | 6 13 19 26 32 39<br>45 52 58 64 71 77 | 8 15 24 32 40 47<br>55 63 71 79 87 95 | 10 19 29 38<br>48 57 67 76 | 11 22 34 45<br>56 67 78 90 | 13 25<br>38 50 | 14 28<br>42 56 | | |
| | | | 3 5 8 11 14<br>16 19 22 24 | 5 9 14 19 23 28<br>33 37 42 46 51 56 | 6 13 19 26 32 39<br>45 52 58 64 71 77 | 8 15 24 32 40 47<br>55 63 71 79 87 95 | 10 19 29 38<br>48 57 67 76 | 11 22 34 45<br>56 67 78 90 | 13 25<br>38 50 | 14 28<br>42 56 | | |
| | | | 3 5 8 11 14 | 5 9 14 19 23 28 | 6 13 19 26 32 39 | 8 15 24 32 40 47 | 10 19 29 38 | 11 22 34 45 | 13 25 | 14 28 | | |
| | | | 3 5 8 11 14 | 5 9 14 19 23 28 | 6 13 19 26 32 39 | 8 15 24 32 40 47 | 10 19 29 38 | 11 22 34 45 | 13 25 | 14 28 | | |
| 18 | | | 4 7 11 14<br>18 22 25 | 6 12 18 24 30 37<br>43 49 55 61 69 | 8 17 25 34 42 50<br>59 67 76 84 92 | 10 21 31 41 52 62<br>72 83 93 104 114 | 12 25 37 50<br>62 74 87 99 | 15 29 44 58<br>73 88 102 | 16 32<br>48 65 | 18 36<br>53 71 | | |
| | | | 4 7 11 14 | 6 12 18 24 30 37 | 8 17 25 34 42 50 | 10 21 31 41 52 62 | 12 25 37 50 | 15 29 44 58 | 16 32 | 18 36 | | |
| | | | 4 7 11 14 | 6 12 18 24 30 37 | 8 17 25 34 42 50 | 10 21 31 41 52 62 | 12 25 37 50 | 15 29 44 58 | 16 32 | 18 36 | | |
| | | | 4 7 11 14 | 6 12 18 24 30 37 | 8 17 25 34 42 50 | 10 21 31 41 52 62 | 12 25 37 50 | 15 29 44 58 | 16 32 | 18 36 | | |
| 20 | | | 4 [illegible] 14 18<br>22 27 32 | 8 16 23 31 39 47<br>55 62 70 78 86 | 11 21 32 42 53 64<br>74 85 95 106 117 | 13 26 39 52 66 79<br>92 105 118 131 144 | 16 32 48 63 79<br>95 111 127 143 | 18 37 55 73<br>92 110 128 | 20 41<br>61 81 | 23 45<br>68 90 | 25 50<br>75 100 | 27 |
| | | | 4 9 14 18 | 8 16 23 31 39 47 | 11 21 32 42 53 64 | 13 26 39 52 66 79 | 16 32 48 63 79 | 18 37 55 73 | 20 41 | 23 45 | 25 50 | 27 |
| | | | 4 9 14 18 | 8 16 23 31 39 47 | 11 21 32 42 53 64 | 13 26 39 52 66 79 | 16 32 42 63 79 | 18 37 55 73 | 20 41 | 23 45 | 25 50 | 27 |
| | | | 4 9 14 18 | 8 16 23 31 39 | 11 21 32 42 53 64 | 13 26 39 52 66 79 | 16 32 42 63 79 | 18 37 55 73 | 20 41 | 23 45 | 25 50 | 27 |
| 22 | | | 6 11 17 22 | 10 19 29 39 48 | 13 26 39 52 66 | 16 33 49 66 82 98 | 20 39 59 78 | 23 45 68 90 | 25 50 | 28 56 | 31 62 | 33 |
| | | | 6 11 17 22 | 10 19 29 39 48 | 13 26 39 52 66 | 16 33 49 66 82 98 | 20 39 59 78 | 23 45 68 90 | 25 50 | 28 56 | 31 62 | 33 |
| | | | 6 11 17 22 | 10 19 29 39 48 | 13 26 39 52 66 | 16 33 49 66 82 98 | 20 39 59 78 | 23 45 68 90 | 25 50 | 28 56 | 31 62 | 33 |
| 24 | | | 7 14 21 | 12 24 35 47 59 | 16 32 48 64 80 | 20 40 60 80 100 | 24 47 71 94 | 27 55 82 110 | 31 61 | 34 69 | 38 75 | 41 |
| | | | 7 14 21 | 12 24 35 47 59 | 16 32 48 64 80 | 20 40 60 80 100 | 24 47 71 94 | 27 55 82 110 | 31 61 | 34 69 | 38 75 | 41 |
| | | | 7 14 21 | 12 24 35 47 59 | 16 32 48 64 80 | 20 40 60 80 100 | 24 47 71 94 | 24 55 82 110 | 31 61 | 34 69 | 38 75 | 41 |
| 26 | | | 8 16 25 | 14 28 42 56 70 | 19 38 57 76 95 | 24 48 72 96 120 143 | 28 57 85 113 | 33 65 98 131 | 36 73 | 41 82 | 45 90 | 49 |
| | | | 8 16 25 | 14 28 42 56 70 | 19 38 57 76 95 | 24 48 72 96 120 143 | 28 57 85 113 | 33 65 98 131 | 36 73 | 41 82 | 45 90 | 49 |
| 28 | | | 10 20 29 | 17 33 50 66 | 22 45 67 90 112 | 28 55 84 112 140 168 | 33 66 100 133 | 38 76 115 153 | 43 86 | 48 96 | 53 | 57 |
| | | | 10 20 29 | 17 33 50 66 | 22 45 67 90 112 | 28 55 84 112 140 168 | 33 66 100 133 | 38 76 115 153 | 43 86 | 48 96 | 53 | 57 |
| 30 | | | 11 23 34 | 19 38 57 77 | 26 52 78 104 | 32 65 97 130 162 | 39 77 116 154 | 44 89 133 177 | 50 100 | 56 111 | 61 | 67 |
| | | | 11 23 34 | 19 38 57 77 | 26 52 78 104 | 32 65 97 130 162 | 39 77 116 154 | 44 89 133 177 | 50 100 | 56 111 | 61 | 67 |
| 32 | | | 13 26 39 | 22 44 66 88 | 30 60 90 120 | 37 75 112 149 186 | 44 89 133 178 | 51 102 153 204 | 57 114 | 64 128 | 71 | 78 |
| | | | 13 26 39 | 22 44 66 88 | 30 60 90 120 | 37 75 112 149 186 | 44 89 133 178 | 51 102 153 204 | 57 114 | 64 128 | 71 | 78 |
| 34 | | | 15 29 | 25 50 75 100 | 34 68 102 136 | 42 85 127 169 212 254 | 50 101 151 202 | 58 116 174 232 | 65 129 | 73 146 | 81 | 89 |
| 36 | | | 16 33 | 28 56 85 113 | 38 77 115 153 | 48 96 143 191 239 | 57 114 170 227 | 65 131 196 261 | 73 146 | 82 164 | 92 | 101 |
| 38 | | | 18 36 | 32 63 95 127 | 43 86 128 171 | 53 107 160 214 267 | 63 127 190 254 | 73 146 219 293 | 82 164 | 92 184 | 103 | 115 |
| 40 | | | 20 40 | 35 70 105 | 48 95 143 190 | 59 118 177 237 296 | 70 141 211 281 | 82 163 245 326 | 91 182 | 103 205 | 116 | 129 |
| 42 | | | 22 44 | 39 78 117 155 | 53 106 158 211 | 65 130 196 261 326 | 78 155 232 310 | 90 180 270 360 | 101 202 | 113 225 | 129 | 145 |

RECOMMENDED CUT (NET) / ACRE

| TYPE OF CUT | PERIOD | SPEC. | CORD | M BD. FT. |
|---|---|---|---|---|
| IMPROVEMENT | | | | |
| SALVAGE | | | | |
| ROTATION | | | | |
| TOTAL | | | | |

TOTAL NET VOLUME

| SPECIES | CORDS | M BD FT |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

AVERAGE PERCENT DEFECT
SAWTIMBER

TOT. CORDS

CEDAR TALLY

| D. B. H. | 7' Posts | 8' Ties | Poles |  |  |  |  |  |  | Shingle Bolts |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | 20' | 25' | 30' | 35' | 40' | 45' | 50' |  |
| 6 |  |  |  |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  |  |  |  |  |
| 12 |  |  |  |  |  |  |  |  |  |  |
| 14 |  |  |  |  |  |  |  |  |  |  |
| 16 |  |  |  |  |  |  |  |  |  |  |
| 18 |  |  |  |  |  |  |  |  |  |  |
| 20 |  |  |  |  |  |  |  |  |  |  |
| 22 |  |  |  |  |  |  |  |  |  |  |
| 24 |  |  |  |  |  |  |  |  |  |  |

SAMPLE TREE DATA

| Tree No. | Dist. & bearing to tree | Spec. | DBH | Height |  | Tree Class | Age | Radial Gr. |  | Defect % |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Total | Merch |  |  | 10 Yr. | 20 Yr. |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

Site Classification ____________ Operability ____________

*Supplementary Cruise Data

Type acreage ________ Cruise % ________ % Accuracy ________

Stand Description ____________________________

Logging chance. Easy____ Medium___Difficult___Winter___Summer____Yearlong_______

Accessibility: Miles of road to construct ________ Total road cost ________

Topography: Level_____ Rolling______ Hilly________ Rugged ________ Rocky________

Recommended Silviculture: Marking__________ Species & % cut __________

Designating: Species & Method______________________

Knutson-Vandenburg needs:

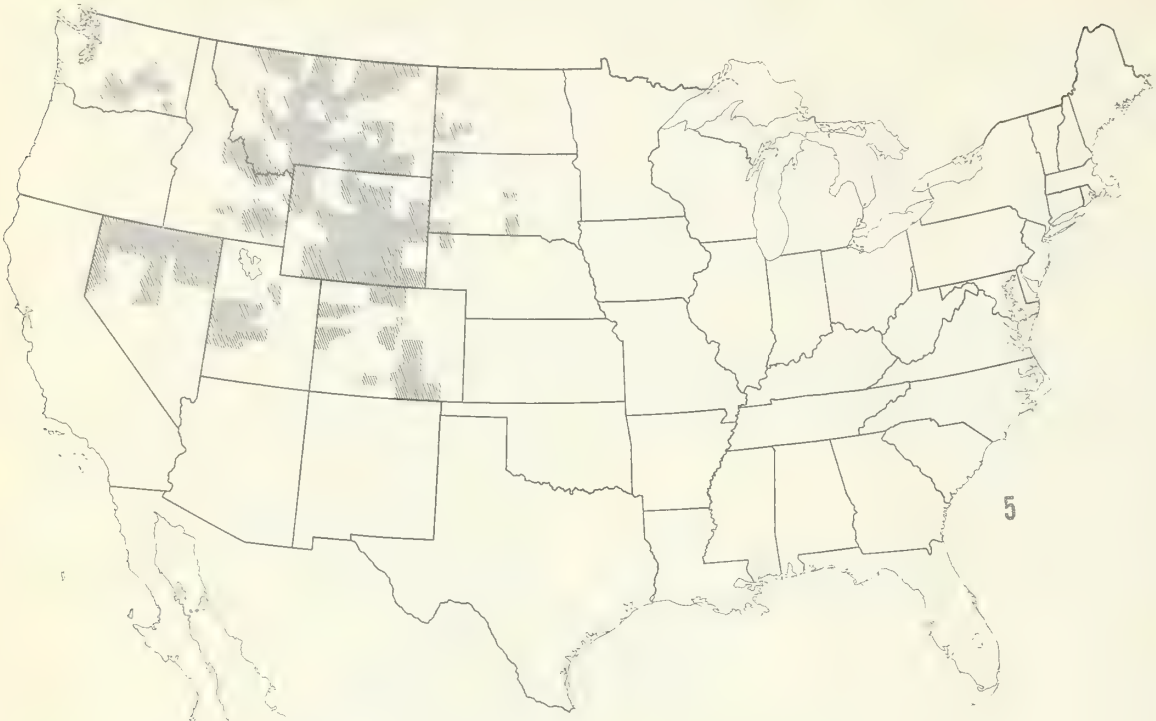
Planting: Acres________ Species & Age Class_________ No. ________ Cost__________

T. S. I.: Acres________ Kind______________________ Cost__________

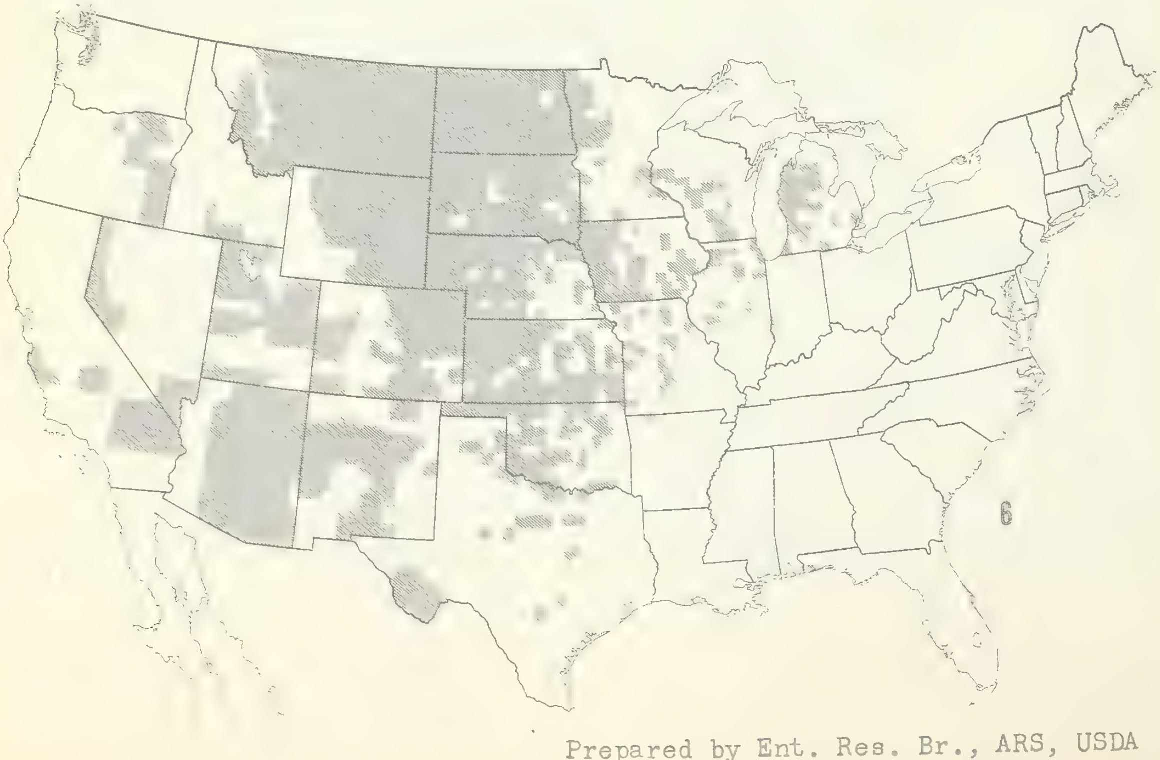
*To be filled in only when tally sheet is used in cruising for timber sale.

## DISTRIBUTION OF RANGE GRASSHOPPERS

Aerochoreutes carlinianus (Thos.)



Ageneotettix deorum (Scudd.)



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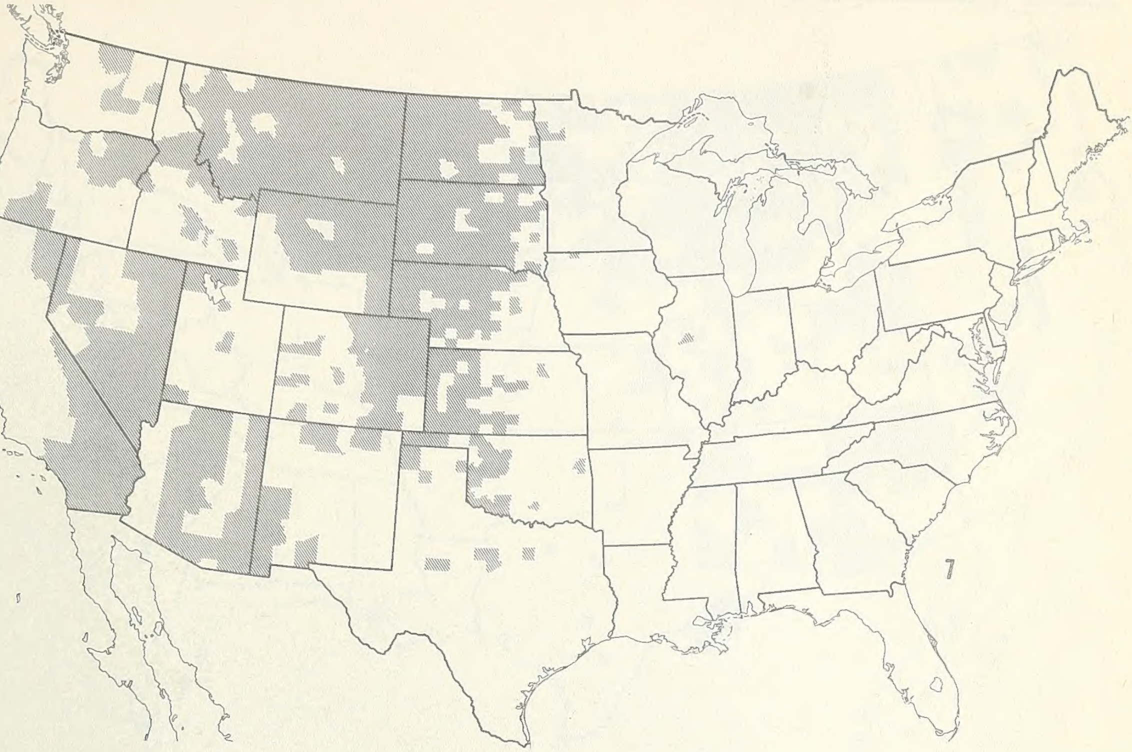
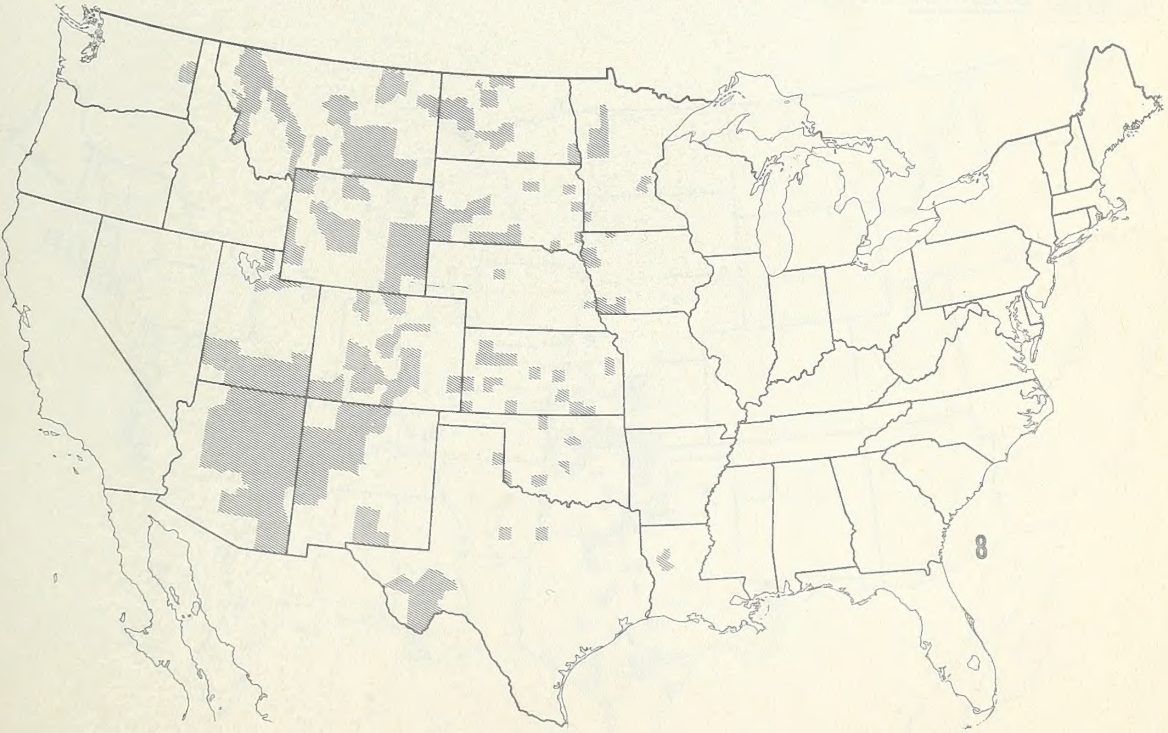
# DISTRIBUTION OF RANGE GRASSHOPPERS

## Amphitornus coloradus (Thos.)



## Arphia conspersa Scudd.



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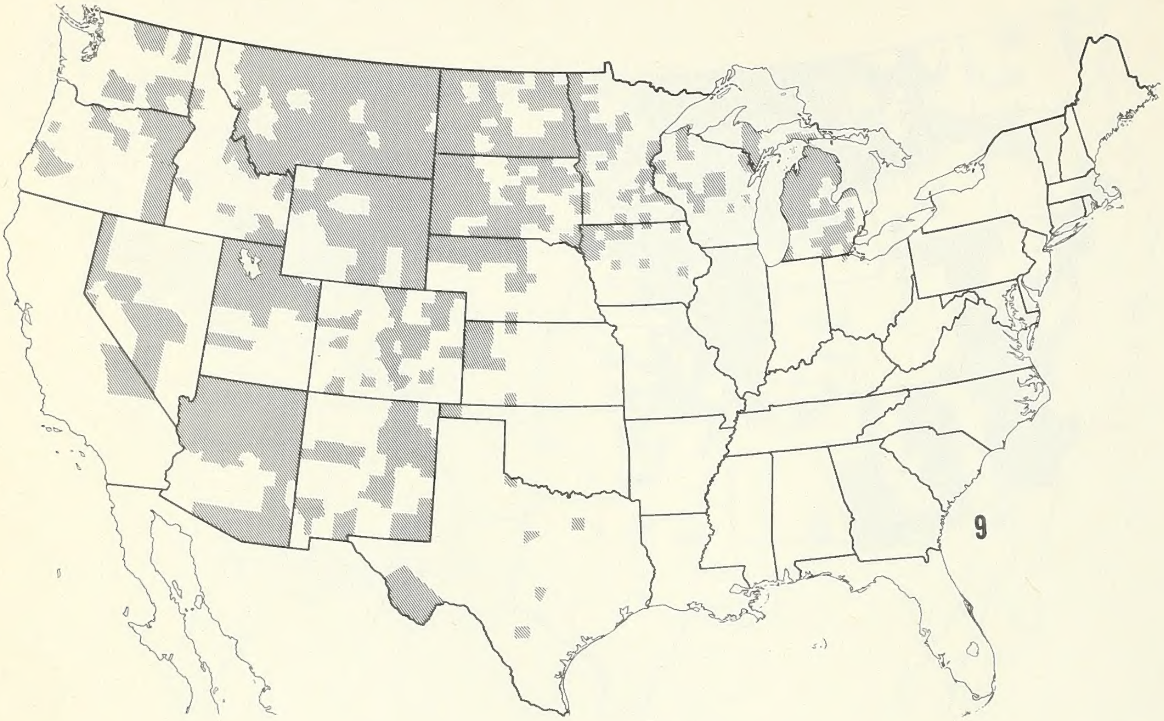
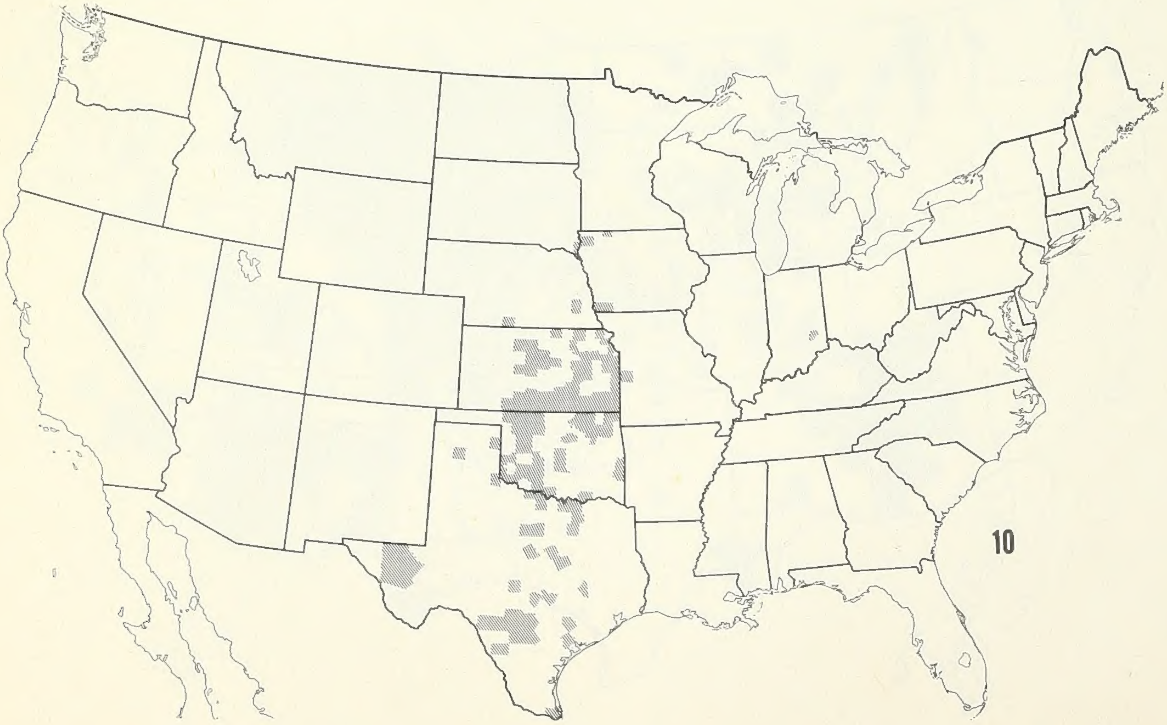
# DISTRIBUTION OF RANGE GRASSHOPPERS

Arphia pseudonietana (Thos.)



Arphia simplex Scudd.



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